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FOOD INDUSTRIES

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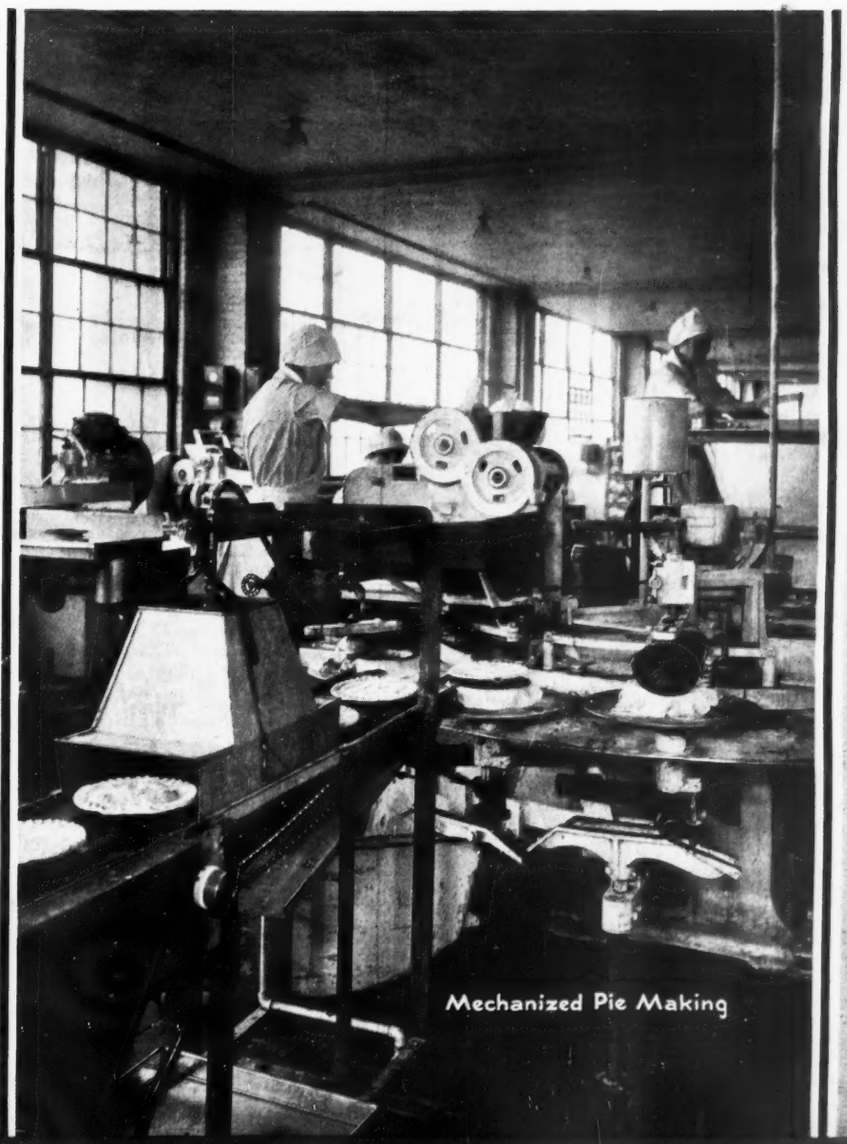

Mechanized Pie Making

FEBRUARY 1931

2 excellent reasons for GAS HEAT in the candy business

1 Working on as narrow a profit margin as does the candy industry, economies must be sought in efficient production management. Gas affords the most economical method of producing heat, and thus promotes lower costs and longer profits.

2 Candy making is a chemical operation. Wherever chemistry is involved, accurate heat control is imperative. Gas heat is capable of minutely accurate control and application. Thus again Gas Heat is the logical one for candy making.

Have you sent for your copy of the new book "Gas Heat"?

AMERICAN GAS ASSOCIATION
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VOLUME 3

FOOD INDUSTRIES

NUMBER 2

The Journal Devoted to the Problems of the Food Manufacturer

Contents for February, 1931

Integrated Experience Yields Better Beverage Plants 52
By A. C. Johnson

Incentive Wage Plan for Truck Operators 56
By F. E. Spooner

Preventing Decay and Shrinkage in Citrus Fruits 58
By Earl D. Stewart

Efficient Straight-Line Production Depends on Conveyors 62

Preventing Beverage Spoilage by Pre-fermentation 65
By William L. Owen

Selecting Grain for the Baker by Scientific Grading 67
By R. C. Sherwood

California Progresses in Preserving Citrus Juice 71
By M. A. Joslyn and George L. March

The Consent Decree—After Modification: What? 74
By O. Fred Rost

What Is Wrong With Lard Sales? 76
By Sleeter Bull

Storing Canned Fruits at High Temperatures Injures Quality 77
By E. F. Kohman

Digest of Technical Papers at National Canners' Convention 78

Editorials 49	Letters 82	News of the Month..... 86
Current Literature 80	Patent Digest..... 83	Trade Notes 90
Government Publications. 81	New Equipment 84	Personals—Obituary ..90-91
Book Reviews 82	Manufacturers' Catalogs. 85	New Construction 91

Copyright, 1931, by McGraw-Hill Publishing Company, Inc.

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Tenth Ave. at 36th Street, New York, N. Y.
CABLE ADDRESS:
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NEW YORK District Office - 285 Madison Avenue
BOSTON - - - - - - 1427 Statler Building
WASHINGTON - - - National Press Building
CHICAGO - - - - - 520 N. Michigan Ave.
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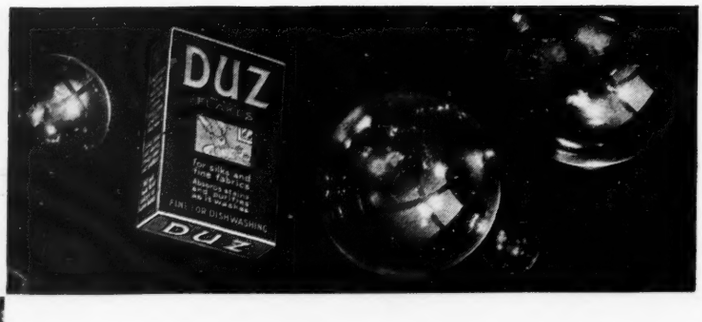
Published monthly. $2 per day. 25c. per copy. Entered as second-class matter April 20, 1929, at the Post Office, New York, N. Y., under Act of March 3, 1879. Printed in U.S.A.

IN SOAP

as in all packaging—



THE LEADERS

use Pneumatic Machines

Lux, Ivory, Duz, 20 Mule Team, Prides, Super-Suds—these are names to conjure with in the soap industry. Together, their productions represent billions of packages yearly.

Keeping pace with production, holding down waste and costs in their tremendous packaging operations is a major problem to them. Significant is the fact that they have all chosen the same method as the most efficient answer to their packaging needs . . . Pneumatic Scale Packaging Machinery.

Not only in soap, but in practically every packaging industry, the largest producers employ this same method of packaging their product. As a manufacturer of packaged goods, no matter what your output, the efficiency of your packaging operations is a matter that vitally influences sales, good will, and profits . . . If you are contemplating the purchase of packaging machinery, if you desire to increase the efficiency of any phase of your packaging operations you can do no better than to investigate the advantages of this system that has the endorsement of America's most successful producers.

Write for a copy of "An Interview," an unusual presentation of the qualifications of the Pneumatic Scale Corporation and its ability to serve you.

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Carton Feeders—Bottom Sealers—Lining Machines—Weighing Machines (Net and Gross)—Top Sealers—Wrapping Machines (Tight and Wax)—Capping Machines—Labeling Machines—Vacuum Filling Machines (for liquids or semi-liquids)—Automatic Capping Machines—Automatic Cap Feeding Machines
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PACKAGING MACHINERY

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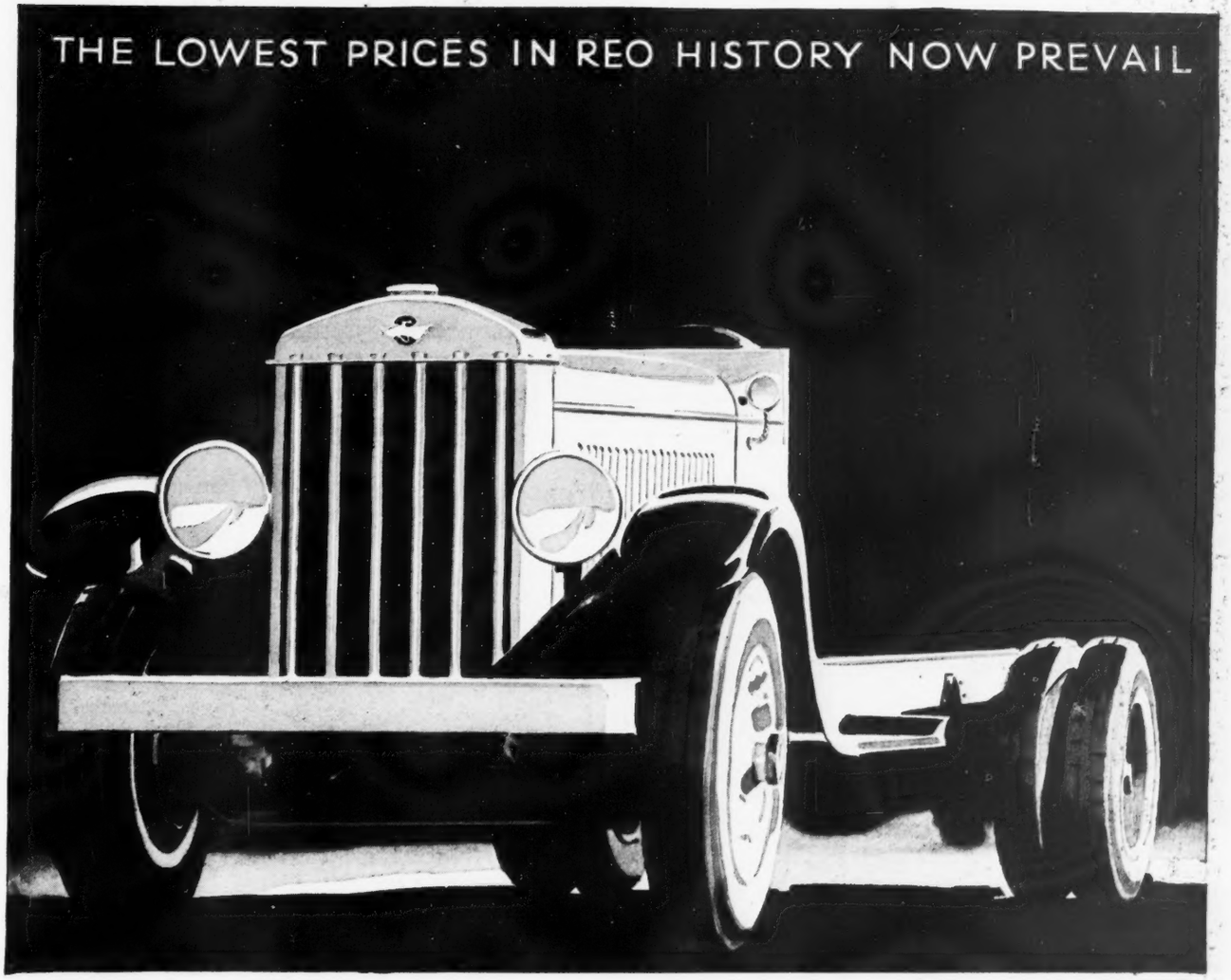

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Now Better than Ever!

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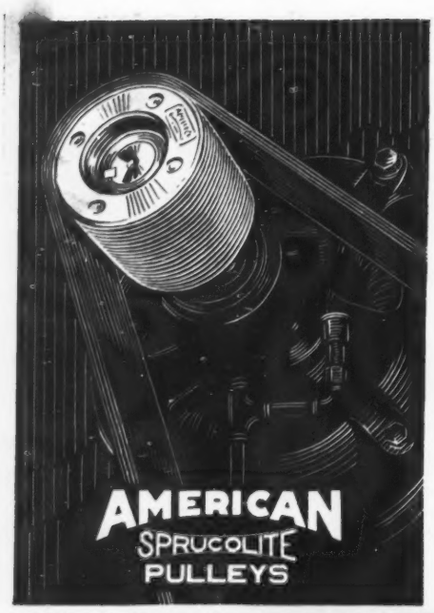
MANY new and exclusive REO refinements, coupled with a record low price on the REO TONNER, have established new high standards of truck value.

Compare REO economy and long life factors—all-day speed on the highways and unrivaled agility in traffic; long-wearing chrome-nickel iron cylinder block and special alloy "Lo-Ex" pistons; REO-designed transmissions; the most effective brakes known to trucking; specially designed frames and springs; magazine oilers!

REO chassis and body combinations meet 95% of all haulage needs. See the latest REO SPEED WAGONS AND TRUCKS. Your REO dealer will gladly show how they will meet your requirements.

REO MOTOR CAR COMPANY, LANSING, MICHIGAN

SPEED WAGONS REO **AND TRUCKS**

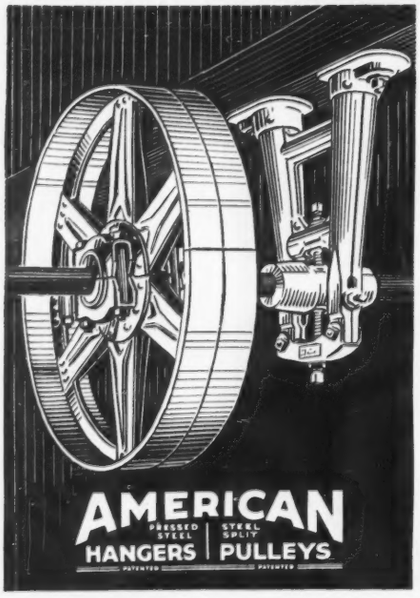


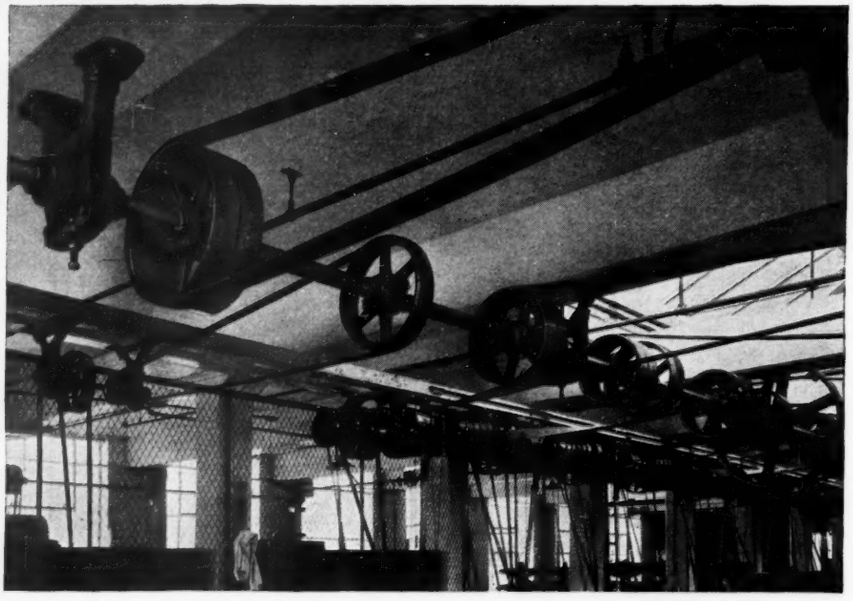
SERVING MODERN TRANSMISSION NEEDS

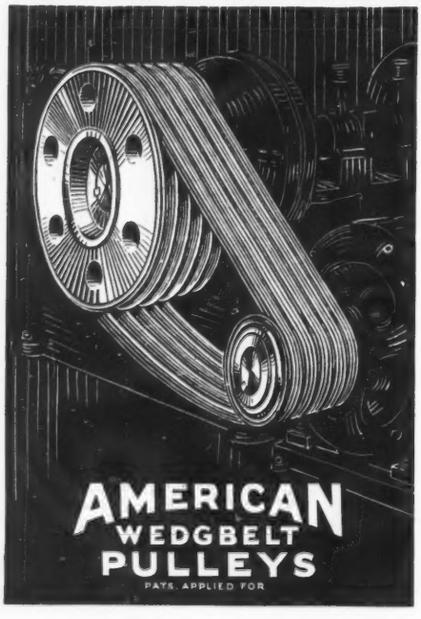
Plants conspicuous for their highly successful use of the group drive for efficient, economical power distribution have in a majority of cases selected American Pulleys and Hangers.

There are good reasons for this preference. American products, scientifically correct for the particular duties they are to perform in the carefully studied transmission systems of today, possess characteristics that are vital.

For instance, American Pressed Steel Shafting Pulleys are designed with great strength, yet are pounds lighter







in weight, reducing the dead load on shafting. Thin A-braced arms cut the air instead of fanning it. American Shafting Pulleys possess a higher coefficient of friction at high speeds due to the exclusive grooved air escape that dissipates the air cushion under belt. More dependable, they withstand greater stresses and eliminate costly interruptions in production schedules.

Ask any dealer about American Transmission Products; American Shafting Pulleys and Hangers; Sprucolite Motor Pulleys; American Wedgbelt Drives; or write for further information.

THE AMERICAN PULLEY COMPANY

4200 WISSAHICKON AVENUE PHILADELPHIA, PA.

General Seafoods Corp., one of the largest packaged fish producers—find process water chlorination pays.

THIS QUESTION OF SPOILAGE

If you are keen to eliminate spoilage look to your process water. Is it contaminated?

If it is, it's a sure source of spoilage. But—it can be chlorinated and 50 cents a million gallons is a small premium to pay for absolutely pure process water.

Throughout the world two hundred million lives are safeguarded from water borne disease because of chlorination. Drinking water in over thirty-five hundred American municipalities is daily sterilized with W & T chlorinators.

Why not give your products and your customers this same protection?

We will gladly tell you how.

WALLACE & TIERNAN CO., INC.

Manufacturers of Chlorine Control Apparatus

NEWARK, N. J.

OFFICES IN PRINCIPAL CITIES

A Product of

WALLACE & TIERNAN

"The only safe water is a sterilized water"

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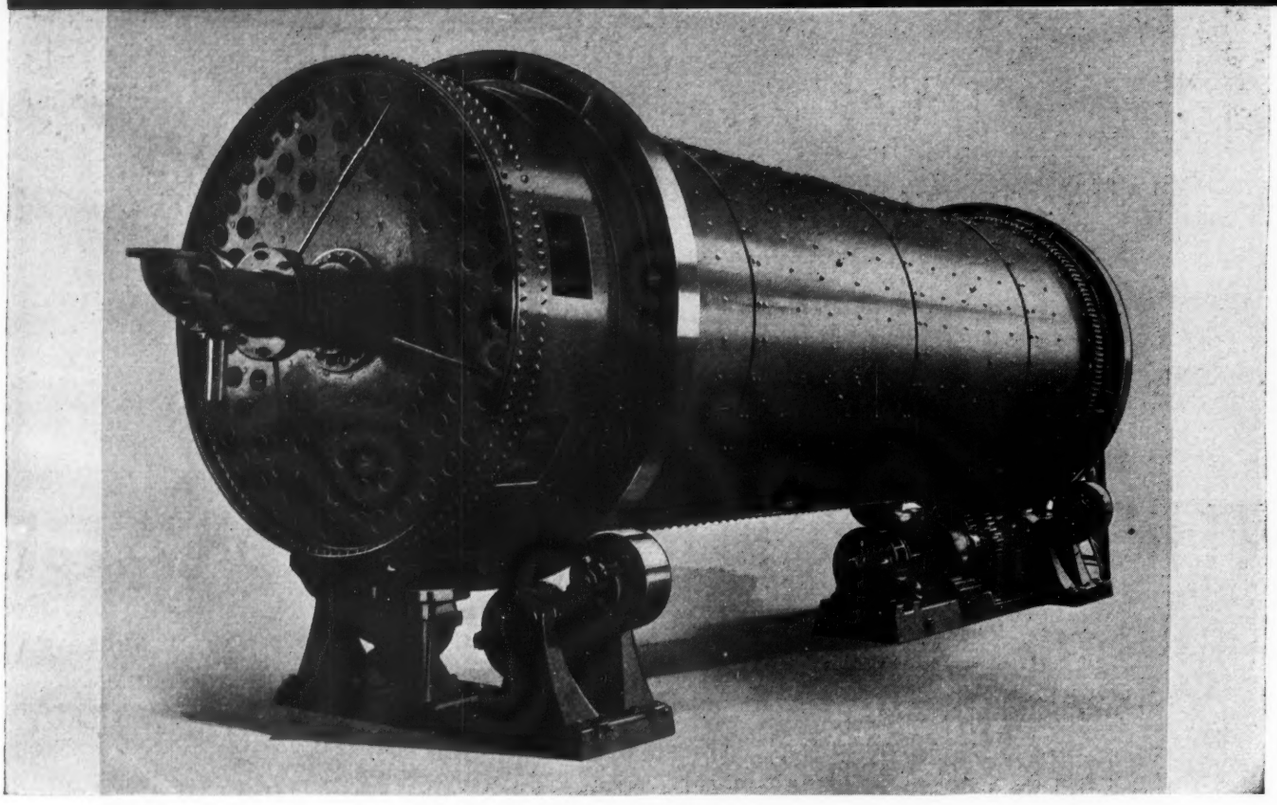
DRY



Increase Drying Capacities and Lower Costs . . . with this Modern Equipment

Improved uniform product—increased capacities under all climatic conditions—lowered fuel and power costs—negligible maintenance—these are the guarantee offered by Galland-Henning's 41 years of experience in building and installing all types of Rotary Continuous and Batch Dryers . . . Complete engineering service available to give every job special attention—Let us figure with you on possible equipment, regardless of tonnage requirement.

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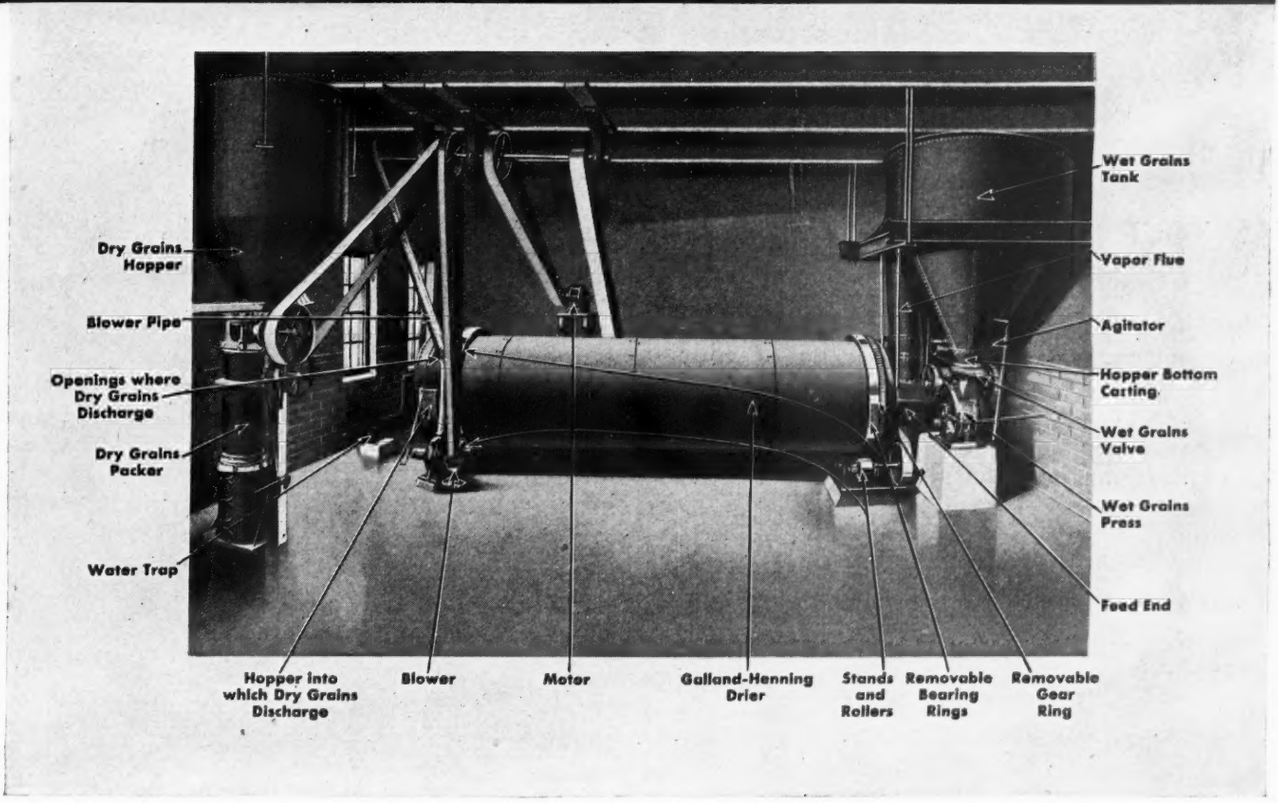


Typical installation of a wet grains dryer. Arrangement best suited to lowest processing cost at this particular plant.

Users say: (1) "Have nothing but praise for the efficiency and simplicity of operation of Galland-Henning Dryers."

(2) "The six dryers purchased for our factories are highly satisfactory in every respect. They turn out a high grade of pomace at a very low operating cost."

(3) "We are well pleased with the five dryers purchased from you. The cost of operation is exceedingly low and the product is excellent. We do not feel your equipment or service can be improved upon."

(4) "Product of our Galland-Henning Dryers is exceptionally uniform, of good color and well dried. There is no maintenance cost to speak of and operation is simple and profitable."

GALLAND-HENNING
MANUFACTURING COMPANY
2705 South 31st Street Milwaukee, Wisconsin

A *message to the*

Sales managers of America

[*. . . and some points of interest to Advertising Managers as well*]

IN YOUR desire to do a bang-up job of increasing sales during 1931 have you overlooked or failed to analyze properly this important factor in the distribution of your product — your package design?

Package design has a vital influence on sales. You will find such concerns as the Kraft Cheese Company, Swift & Company, General Foods Corporation, Jewel Tea Company and other leading manufacturers rapidly discarding package designs that handicap sales and adopting new containers of proper construction and design.

We are now redesigning containers for six nationally known manufacturers. Improvements we are recommending involve changes in color scheme — package construction — typography — illustrative matter — and method of packing. All these technical and sometimes psychological points are based on analysis by Sutherland specialists.

Have you mentally "stood aside" and considered your own packages from a purely unbiased standpoint? Have you ever tried to learn what your prospective buyers think about them? If not, we urge you to take advantage of this opportunity to do so.

We maintain what we call a "Packaging Laboratory." This is the first time we have offered the services of this department to other than buyers of Sutherland containers. We invite you to let us prepare a clear and candid analysis of your package.

It is not the function of this department to act as a fault-finding guild, but rather to consider carefully what is good or what is in need of improvement in any package submitted to the "Laboratory." Where improvements are recommended, tangible ways and means of bringing them about will be included in the survey.

You are placed under no obligation whatever in requesting one of these surveys. You may accept or reject the findings as you see fit, although we will be glad to continue comments on any points set forth.

Simply mail a sample of your package (either in use or proposed) with a letter signed by yourself or another officer of your company. Address **Department of Design, Sutherland Paper Company, Kalamazoo, Mich.**

Your time is limited—the crowds passing up and down the street keep moving. Buyers going in and out the store do not take time to linger. Window shoppers pause and then pass on.

The average window shopping time is only eleven seconds. These brief moments are all you have for your store-front appeal. They represent the entire interval for your point-of-purchase sales talk.

No time for idle words. No place for elaborate displays.

You must capture the attention instantly. Your suggestions must be pertinent. Your conclusions obvious.

Meyercord Weather-Tested window signs, as you will observe by the illustration on the next page, tell their story at a glance. They are designed and timed to fit this eleven-second interval. Ask for samples!

THE MEYERCORD CO.
120 South La Salle Street, Chicago, Illinois

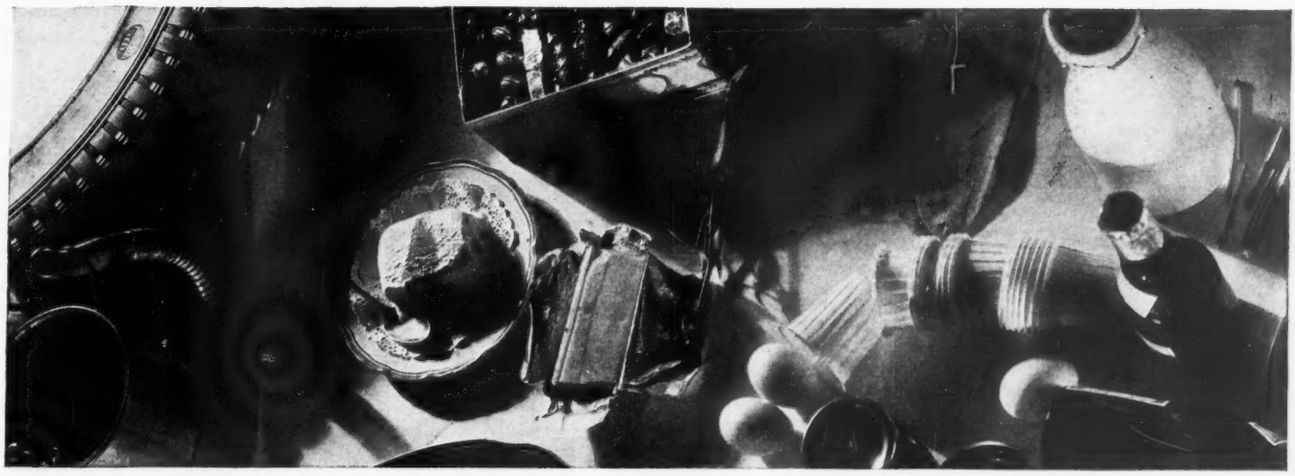
signs like these identify your dealers with your product. Just as the button on your coat lapel —the insignia on your watch chain identifies you with your lodge, fraternity, club or school so does a Meyercord All-Purpose window sign identify your dealers with your product. Its sparkling colors, visible at a distance, point out your stores to buyers—its clear-cut illustrations suggest your brand to shoppers —its concise and easily readable message invites lookers inside. Whether on the dealer's window, counter, mirror or display case, your trade-mark in the form of a Meyercord All-Purpose transfer sign will strike the eye of the buying public with a forceful sales suggestion. A hundred layout and color experts are ready to design unique and effective window advertisements for your products. Their services are free for the asking.

MEYERCORD SIGNS

The Positive Tie-up ALL-PURPOSE The Medium of Dealer Preference

THE MEYERCORD CO., 120 South La Salle Street, CHICAGO

REFRIGERATION
is more
than Machinery . . !



In hotel, restaurant or hospital . . . in baking, soft-drink bottling or ice-cream manufacturing . . .

Whatever specific service you expect from your refrigeration . . . whether food preservation, process improvement, or air conditioning . . .

In the final analysis, your Refrigeration must yield profits.

To do this, refrigeration can't remain just so much machinery . . . however well-designed and built. It must be engineered and installed to fit your needs exactly . . . it must increase your operating efficiency . . . improve your product . . . build up your patronage.

York Refrigeration does all this. York's experience with refrigerating machinery dates back over 50 years, and has been utilized to work out individual applications of refrigeration to hundreds of industries. York equipment applied to these industries has made a great record of profitable, uninterrupted service. As a result, York has today a vast fund of technical knowledge and operating data covering refrigeration in every industry and business.

This knowledge and this experience can be put to work for you . . . to plan refrigerating installations that will exactly meet your needs and yield increased profits. They are available through York Engineering Service. Communicate today with the nearest of York's 71 direct factory branches . . . you will find it conveniently located to your business.

YORK ICE MACHINERY CORPORATION
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AIR CONDITIONING DIVISION
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ICE CREAM AND MILK PLANT DIVISION
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ACCESSORY AND SUPPLY DIVISION
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EXPORT DIVISION
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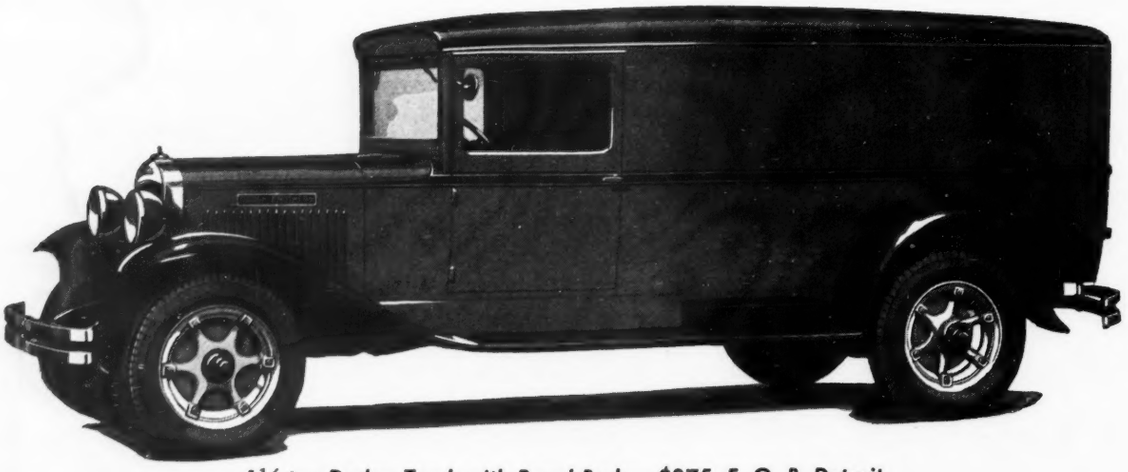
SERVICE AND MAINTENANCE DIVISION

YORK
REFRIGERATION



1½-ton Dodge Truck with Panel Body—$875, F. O. B. Detroit

DEPENDABLE FOOD DELIVERY AT LOW COST WITH 1½ TON DODGE TRUCK

YOUR investment will be small. Your per-mile cost will be low because economy, dependability and long life are assured by: full force-feed engine lubrication . . . heavy-duty 4-speed transmission . . . massive full-floating rear axle . . . 4-wheel, internal hydraulic brakes . . . 48-horsepower truck engine . . . rugged 7-inch frame . . . sturdy single-plate clutch and other modern features that result from advanced truck engineering and precision-build.

. . .

See your Dodge Brothers dealer. See, inspect and test this exceptional truck. Buy it complete with standard or special body.

$595

CHASSIS F. O. B. DETROIT. DUAL REAR WHEELS AT SLIGHT EXTRA COST

DODGE TRUCKS RANGE IN PAYLOAD CAPACITIES FROM 1,200 TO 11,175 POUNDS

A New Tool for Food Chemists »

NOW that the laboratory instruments of the scientist are becoming the tools of modern industry, the food chemist is finding microscopy a valuable aid to precision determinations in many phases of his work. The Chemical Microscope, offered by Bausch & Lomb, is an instrument that specially applies to food chemistry wherever a polarizing microscope is required.

This Chemical Microscope has recently been entirely redesigned. The new stand allows ample room for manipulation of specimens. A circular revolving nosepiece gives quick, convenient change of magnifications. The graduated circular revolving stage is much larger than on previous models. Polarizing equipment has also been improved.

Write for literature completely descriptive of the Chemical Microscope.

BAUSCH & LOMB OPTICAL CO.
603 St. Paul Street « » Rochester, N. Y.

TO GREATER VISION THROUGH OPTICAL SCIENCE
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MAKERS OF ORTHOGON EYEGLASS LENSES FOR BETTER VISION

They stand the TEST

POND'S ceilings and walls Remain White

And these Leaders in the Food Industry, too

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ALBERT EHLERS, INC.

SPERRY CANDY CO.

SOUTHERN BISCUIT CO.

NO dainty foods, no carefully prepared medical supplies need more painstaking cleanliness in their preparation than the world-famous Pond's Creams. A tiny speck of dirt . . . a bit of soot instantly mar these delicate beauty preparations. Hence at Clinton, Connecticut, Pond's Creams are made . . . in rooms kept bright, clean and sanitary with Barreled Sunlight.

Tested for twenty-five years by leaders in industry, like Pond's, Wrigley, Steinway, Kellogg, Mennen, Western Electric, Cannon Mills, Clicquot Club, it is no wonder that in the food business, too, where cleanliness and light are also needed, Barreled Sunlight has been the choice of discriminating leaders.

Here is an interior paint that possesses four major qualities. It is a simple story, quickly and easily told . . . whiteness, light reflection, cleanliness and economy.

The secret and exclusive process used in Barreled Sunlight makes possible the guarantee that it will remain white longest. This is the answer to yellowing . . . the bugaboo of ordinary paints.

Barreled Sunlight is smooth, dirt-resisting, washable as tile. Month after month, it keeps clean, white and bright. So smooth, so non-porous is it that no recesses catch and hold dirt.

These factors, in addition to Barreled Sunlight's tremendous "hiding power" and "ease of flow" (that saves labor-time), spell the all-important *economy* of this pioneer white paint.

The long-lasting whiteness and cleanliness of Barreled Sunlight, its ready washability, its light reflecting qualities are described at length in a new booklet, "Barreled Sunlight for Food Plants." Send for your copy.

U. S. Gutta Percha Paint Co., 37-B Dudley Street, Providence, R. I. Branches: New York—Chicago—San Francisco. Distributors in all principal cities. (For the Pacific Coast, W. P. Fuller & Co.)

Barreled

Reg. U. S. Pat. Off.

OF TIME . . .

GLEAMING WALLS *of white, painted with Barreled Sunlight, in the Pond's Extract Company plant, aid workers in efficient production of the famous Pond's beauty creams.*

• • •

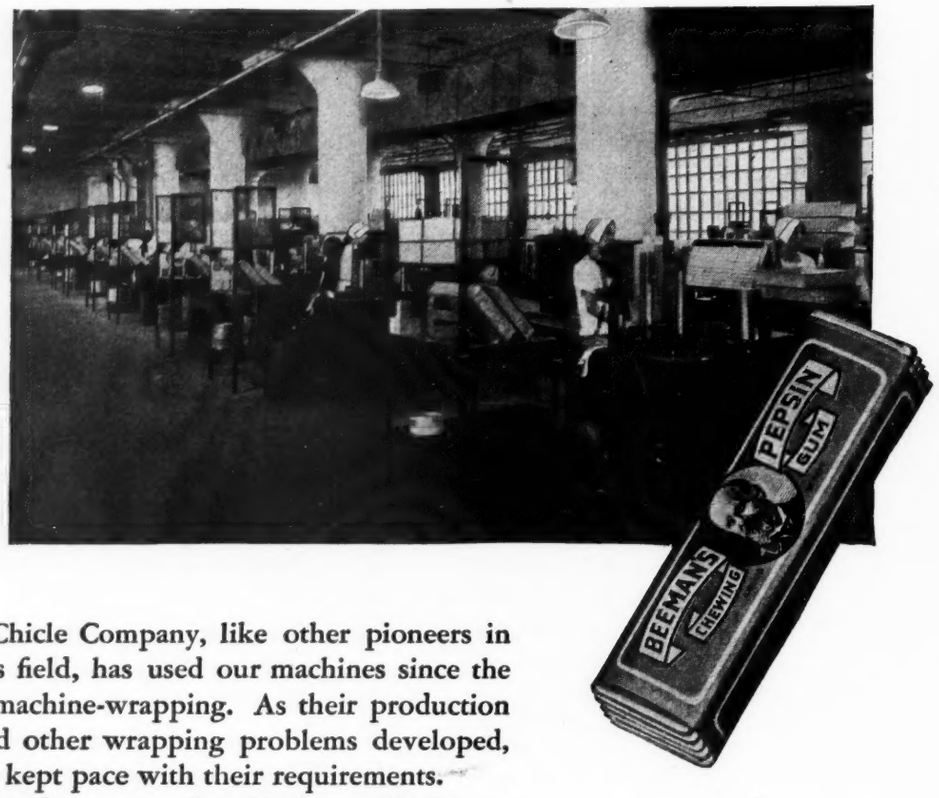
POND'S MODERN FACTORY *in Clinton, Connecticut, where Barreled Sunlight rules favorite as interior paint.*

GUARANTEE . .

BARRELED SUNLIGHT, THE RICE PROCESS WHITE, is guaranteed to remain white longer than any oil gloss paint or enamel, domestic or foreign, applied under the same conditions.

Sunlight

The American Chicle Company *knows*
it can rely on these time-tested wrapping machines



The machine wraps each stick of gum in foil, and bands it; then counts off five sticks and bands them, making the familiar 5¢ package. Only one operator is needed for each machine.

The American Chicle Company, like other pioneers in the package goods field, has used our machines since the very inception of machine-wrapping. As their production has speeded up and other wrapping problems developed, our equipment has kept pace with their requirements.

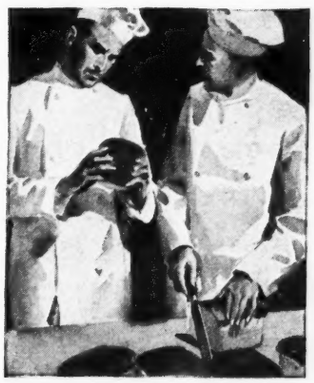
Factory superintendents say that Package Machinery Company machines are remarkable for their dependability, long life, economy of time and material . . . and the way in which they are designed to fill *exactly* the individual needs of the manufacturer.

Are you trying to secure faster production . . . lower costs . . . better wrapping methods? Consult us—***solving problems built our business.***

PACKAGE MACHINERY COMPANY
Springfield, Massachusetts
New York Chicago Los Angeles
London: Baker Perkins, Ltd.

98%

98% of the concerns in the chewing gum business use our wrapping machines.



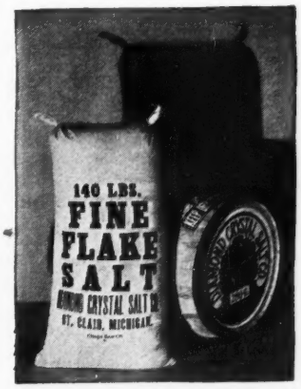
● Baking is but one of the many branches of the food industry in which Diamond Crystal Salt has opened the way to greater success. We should be glad to send you detailed information regarding the selection of the salt best suited to your own product

The midnight test caused a skeptical baker to change his brand of salt

"YOU'VE got to show me" had been this baker's attitude when our expert explained that if he would use pure salt, Diamond Crystal Salt, he would be able to increase his salt content and thereby improve his bread flavor.

Many objections came to the baker's mind. He feared that the greater salt content would make the dough over-salty, send too stringy a paste through the mixer, cause a lag in fermentation time. So we offered to conduct an actual test right in his own bakery, and to stand or fall by his own judgment of Diamond Crystal's performance.

A little before midnight, our men arrived at the bakery. The first batch of dough was prepared by the baker's foreman, following their usual formula. The next batch was made by our men, using Diamond Crystal Salt; using 2 lbs. more of this purer salt to every 400-lb. batch, also adding 6 extra lbs. of water.



After both lots of loaves had been baked, they were sliced open for comparison. The baker himself remarked that the bread made with Diamond Crystal Salt had much finer flavor, closer texture, and a whiter crumb. In addition, the next day he discovered that this bread would keep moist and fresh longer. And, due to the presence of the extra pounds of salt which toughened the gluten and allowed the use of more water, he had a 4-lb. overrun as still another profitable bonus.

If you too are skeptical as to the importance of salt, we should be glad to conduct a similar test in your own bakery, and allow you to be both judge and jury. Diamond Crystal Salt is salt in its purest form. It is always dependably uniform, is flaked, and is made by the exclusive Alberger process. Diamond Crystal Salt Company, (Inc.). *Bulk Department:* 250 Park Avenue, New York, N. Y.

Year in, year out, Diamond Crystal Salt averages 99.9% pure — or better

DIAMOND CRYSTAL SALT

A PRODUCT OF GENERAL FOODS CORPORATION

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FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

Volume 3.....A McGraw-Hill Publication—Established 1928.....Number 2

NEW YORK, FEBRUARY, 1931

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Laurence V. Burton, Editor

Inter-commodity Competition Brings New Problems

OF ONE THING we may be absolutely certain in this day of uncertainties. It is that everybody is looking for a new way of making more money, or even some money. This fundamental and perfectly understandable human trait is the basis of all progress, and is the cause of all overexpansion, as well as the primary cause of those trying periods of readjustments such as that in which the world now finds itself. Men who are dissatisfied with their economic status try to find ways in which to better themselves.

A MAJOR PRODUCT of this form of activity is seen in the competition of producers of foods for the same market, and it results in inter-commodity competition. A host of cereal manufacturers try to find a place for their breakfast foods on our tables, and when they succeed the dairyman benefits; but when they fail, the citrus grower is the most likely to profit. Southern vegetable growers are competing with Northern vegetable canners. But these forms of competition are mild to the warfare waged between commodities such as butter and margarine or oleomargarine; or between the various forms of sugar; or between lard and vegetable shortenings, and many other products.

THE RECENT TREASURY RULING that oleomargarine made with palm oil as a constituent is not artificially colored and, although it looks like butter, that it need not bear the 10 cent per pound tax customarily assessed against oleo when it is artificially colored, has aroused bitter opposition among the dairy group. The federal law was passed at the behest of the dairymen to prevent the inroads which oleomargarine was making on their markets for butter.

CURIOUSLY ENOUGH, the largest users of butter substitutes have been the farmers themselves, and the greater the differential between the prices of butter fat and margarine, the more the farmers sell their butter fat and purchase the substitute.

LAWS HAVE BEEN PASSED prohibiting the artificial coloring of butter substitutes and long ago one state once had a law requiring them to be colored blue. The federal law requires the substitutes to pay a 10 cent tax if colored. A year ago, Idaho passed an oleomargarine license tax which was calculated to force the product out of the state. Today Washington dairymen also are planning a state license tax on oleo. In Illinois a license tax is proposed.

FOOD INDUSTRIES has been informed by a spokesman for dairy interests that he was en route to North Dakota to aid the enactment of a prohibitive tax on oleo in that state, for he believed the time was opportune for the passage of such an act. With the state governor ready to sign the act as soon as passed, and with the price of butter so close to oleo prices that no opposition could be expected from the rural voters, his estimate of the timeliness of the move is doubtless correct.

SUCH LEGISLATION is dangerous, for it is nothing more than a thinly disguised form of state tariff. Readers with a flair for history will recall that state tariffs nearly wrecked this country in its infancy. If this form of legislation is good public policy, then why should not Michigan put a tax on dextrose sales within its borders to even things up for beet sugar? Or why should not Illinois, a great producer of lard, tax all vegetable shortening, which competes with lard so successfully, so that it will command a higher price than lard? We regard these interstate forms of economic protection as contrary to a sound public policy. Life cannot be freed from competition, and it should be so regarded.

Things Are Happening

MORE events of great importance to food manufacturers have occurred in the last few weeks than in any similar period as far back as we can recall. Only modification of the Sherman Anti-Trust Law could equal in significance the corn sugar ruling, the modification of the Packers' Consent Decree, or the German acceptance of the modified Chadbourne plan of sugar export control.

The possible effects of Consent Decree modification are so important that we have asked O. Fred Rost, marketing specialist of *The Business Week*, to review the whole subject elsewhere in this issue. Aside, however, from the effects on the distribution phase of the food industries, there are other effects that deserve comment.

Ten years is a short time in the life of a nation but is very long in the memory of business men. In 1920 many canners sold their entire output to the meat packers. True, it reduced selling expense to a minimum, but those individuals who succumbed to the allurement of reduced selling cost found that it was but a deferred charge, for when the decree of 1920 was signed they found themselves in the worst depression of the century and without a single customer.

We would warn canners now of the fatal blunder of a marketing policy that involves only a single buyer. This is said not because the buyers are meat packers but because a business that has any less than three customers is in a precarious marketing condition.

Recipes for Profit

POPULARITY for a food product is not determined exclusively by its quality and price. The basis of continued public acceptance is the sense of satisfaction in the mind of the consumer as the food passes from his plate to his digestive system. Of course, quality and price can be so regulated relative to the products of other manufacturers that they contribute greatly to this sense of satisfaction. But out beyond the range of technical control—even beyond the range of price determination—are other factors no less vital to success.

A housewife holds her can opener at the wrong angle—and prejudice against canned foods is created as it slips. She slits the wrong side of a package of crackers—and is disgusted with the rapidity with which they go stale in the gaping package. The profits on a package of food don't appear when the bell rings on the grocery-store cash register, they appear in the smiles around the dining-room table. Increased consumption for any product has its origin in the "have-it-again" sentiment that begins right there. It depends on the saucepans, the water, the temperature, the seasoning, and the state of mind of the diners as they sit down at the table.

Establishment of "test kitchens" by two advertising agencies to develop methods of serving, to perfect recipes, and to clarify labels is a step in extending the influence of manufacturers into this zone.

Broadcasting of "The Hour of the Canny Cook" by the National Canners Association has shown a similar trend on the part of a whole industry. Macaroni manufacturers, realizing that the average housewife knows but one or two ways of preparing their products, are sponsoring a national advertising campaign that features 70 tested recipes. There is a growing realization that one cannot be content merely to sell consumers a good product, but that every effort must be made to get good taste in their mouths and pleasant thoughts in their minds. Destroyed flavor, unattractive appearance, and lack of variety that result from uninstructed preparation of a product for the table may bring it into disfavor as easily as unregulated processing in the plant.

When, by one means or another, the housewife has been given enough interest and confidence in a product to make accurate use of the recipes and suggestions of the maker for its treatment in the home, she becomes a voluntary co-worker in extending process control to its logical end.

Self-Criticism, Wise or Otherwise

BE THANKFUL that you as a factory executive do not live in a communist country like the Soviet Republic, where they go in for bizarre methods of industrial management. An American technologist of our acquaintance who has headed one of the Soviet projects reports that one of these innovations is that of meetings for "self-criticism."

When one of these sessions begins it lasts far into the night and everyone connected with the enterprise has the right, or obligation, to tell everyone else, including the boss, just what is the matter with him, what they think of him, and where he gets off.

There seems to be no recourse or defense for American experts but to attack the critics with a violent and merciless rebuttal that amounts to abuse. The Russians, strangely enough, seem to enjoy the exchange of left-handed compliments, but the outsiders find it demoralizing. Without gaining anything but a complete breakdown of industrial discipline that would be fatal in other countries, the Soviet idea of self-criticism serves to emphasize the wide gap in the fundamental thinking between communism and democracy.

Sugar Presents Complexities

TAKEN by itself, the Chadbourne plan would restrict exports of sugar to a degree that probably would eventually cause a small rise in the price of sugar in the United States. How far it might ultimately rise would be largely dependent on the willingness of domestic producers of sucrose to accept the improved market conditions without again forcing them down by greater production. Indeed FOOD INDUSTRIES had anticipated that sucrose might rise in price in the distant future to a figure that would encourage a further expansion of the domestic sucrose industry. The corn sugar ruling, however, has largely offset that possibility, for its normally lower price will have the effect of encouraging partial replacement of sucrose by dextrose if the price differential becomes marked.

However, until the various branches of the food industry choose to accept the newly permitted uses of dextrose, the advantages accruing from the Chadbourne plan will be largely in favor of the sucrose producers of continental United States. In this interesting case of inter-commodity competition there is need of careful study and shrewd planning for the future, in which the success or failure of the Chadbourne plan is one of the very important factors.

With the United States as one of the largest users of Cuban raw sugar, we can expect the Cuban producers to watch anxiously internal developments in this country and in Russia. It lies entirely within the power of the U.S.S.R. to upset the whole scheme of balance that Mr.

Chadbourne has labored to obtain. The huge surplus of unexported raws in Cuba hangs as a sort of sword of Damocles over the head of domestic producers of both dextrose and sucrose. It would appear that the Chadbourne plan offers them a probability of better economic conditions for a time only.

Creating New Competitors

IT IS extremely unfortunate that economic stress occasionally makes it necessary for management to lay off employees, and it is doubly unfortunate in those branches of the food industry that do not require large initial capital outlay. Frequently the foot-loose individual starts up a new business. Thus an employer who is faced with a need for economy may sometimes be the indirect cause of starting new competition for himself through reduction of his working force.

Where capital outlay is necessarily large, due to the nature of the business, the danger of creating new competition in this way is less; yet, oddly enough, the type of business requiring a large outlay is one in which is more frequently found the superior managerial ability which enables the enterprise to weather the business storms.

It is more unfortunate that some owners or executives in high positions display short sightedness through discharge of able department heads because of mergers or for personal reasons, an action which not only often converts a profitable employee into a competitor but too frequently actually weakens the companies from which these employees are discharged.

Reductions or changes in personnel are made, presumably, for the purpose of strengthening the economic position of the businesses. But where small and inexpensive units may enter directly into competition with large units, a temporary payroll relief or a sudden change in personnel may result in a permanently greater problem of competition. Those who may be forced by circumstances to contemplate reductions in working personnel should think clear through the proposed action. The possibility of a less drastic move should be sought before acting.

Benefiting by Competitors' Criticism

IN AMERICAN food manufacture a form of self-criticism is developing that is worthy of commendation. A feature of most state and regional canners' association meetings are so-called cutting bees—most interesting and instructive affairs where member canners examine unidentified random samples of their products and subject them to the closest and severest scrutiny and criticism.

A thousand cans may be examined at a time with code numbers of the entries known only to their respective donors. These critical examinations serve several useful purposes. Since the entries are selected at random, they give an accurate picture of the year's pack, and when the records are examined and compared with those of previous years, any divergence from the trade standards may be determined. They give a canner opportunity to learn whether his pack is as good as he thinks it is and how it compares with the packs of his undisclosed competitors. As the grading is "blind," subjective errors that creep in where one is judging his own goods are eliminated.

Because the examinations are on a non-competitive basis, entries submitted will represent the average of factory production. This practice makes them far more valuable than competition for prizes or ribbons, where the samples are chosen with the award itself in mind.

A similar examination was initiated in 1930 by the Mayonnaise Products Manufacturers' Association at its national convention. Approximately 30 unidentified entries of mayonnaise were displayed and the members were allowed to examine them at will. Here, however, there was no board of judges to make incisive criticism, although we believe that this will come in time.

The whole system of critical non-competitive examination on the lines here described is a valuable one that should be followed by more branches of the industry. To a manufacturer who is of the opinion that his own products cannot be improved in quality, the criticisms may have a humbling effect.

Air as a Tool In the Food Factory

AIR usually is regarded by industry merely as a medium of heating, ventilating, or occasionally of conditioning the atmosphere in the factory. It has many other important possibilities of service. It may be used as a cooling or drying medium. For such purposes as the setting of frostings on cookies or hardening of coatings on dipped candy it is at times necessary to use refrigerated air.

Air, of course, is frequently a splendid conveying medium. Modern machinery is available by which washed, clean air can be furnished cheaply at pressures which enable its use for the handling of powdered material through pipes and ducts, often at costs lower than other systems of mechanical handling will permit. It is merely a variation of this conveying function that air exercises when used with blast nozzles for the cleaning of machine parts, either as a routine operation regularly between successive functionings of the device or through hand tools during the periodic clean-up by the machine operative. Similarly, air movement through suction or vacuum systems often is the only sanitary means for factory cleaning, picking up dust, broken fragments, and all manner of factory lint or dirt, and conveying it out of the processing rooms, with vast improvement in the sanitary conditions. A specialized use is often seen in the picking up of broken, burned, or other defective pieces which must be individually removed from inspection belts before packaging.

For the application of this valuable tool, factory managements have offered to them today a wide variety of vacuum and pressure-blowing equipment. These devices of general use are quite widely recognized. Equally important are the less frequently used unit heaters and coolers. Combining a small blower or fan with a unit burner or refrigerating device, hardly bigger than a household machine, enables the placing of heated or cooled air exactly at the spot where needed with a minimum of expenditure for gas and power and with the minimum investment in the equipment itself. Oftentimes by judicious use of these unit devices the time interval between successive plant operations may be materially shortened. In some cases it is possible by means of unit coolers or dryers to have material pass directly from one processing stage to another without going into intermediate storage. This represents a very great advantage, because it not only eliminates the labor of handling in and out of storage but also the large space requirements involved in the storage itself.

A "100 per cent standard" Coca-Cola bottling plant at Gadsden, Ala., opened last year. Equipment with a capacity of 2,000 to 4,000 cases per day operates behind the plate glass windows

Integrated Experience Yields

BETTER BEVERAGE PLANTS

By A. C. JOHNSON
Secretary, Standardization Committee, Coca-Cola Bottlers, Atlanta, Ga.

THE manufacture of carbonated beverages has developed from a stage in which it could first rightfully be called an industry to its present proportions in the short span of 25 years. As is often the case with rapid growth, a great deal of disorganization, waste, and inefficiency occurred simply because of the lack of any cumulative body of experience. Individuals had built splendid plants carrying out their own ideas of efficiency, sanitation, and the like, but there the matter ended. Others, facing the same sort of conditions, had to gain their experience through mistakes, often as costly to the industry as to the individual himself.

A realization on the part of Coca-Cola bottlers of the mutual value of the experience gained in the same endeavor over a period of years led, at their convention in 1924, to the appointment of the Standardization Committee of Coca-Cola Bottlers. A purely co-operative organization composed of men representing various branches in the production of the bottled beverage, the committee was charged with the duty of developing standards to effect economies in construction, equipment, and operation for the individual bottler which without a central body he could not obtain. No other authority than that of demonstrated success was used to put the standards into practice.

As soon as the committee was organized, it was recognized that the design and location of buildings to house bottling plants was a problem of primary importance. Creation of such standard plans was a long and tedious job. There was nowhere to go for help; no similar work had been done, at least so far as the committee was able to ascertain. A meeting was held and the whole matter was thoroughly discussed. Everyone expressed his ideas as to the methods of procedure and the results desired. From this meeting emerged a resolution appointing a smaller subcommittee which could be gotten together quickly and from which decisions could be obtained in a short time.

The first act of the subcommittee was to put architects and engineers on the job. While they were making a complete study of the industry, various members of the committee were obtaining all possible information from individuals who were actually operating plants. When the committee again met with the consultants, every available bit of information was poured into the hopper. From

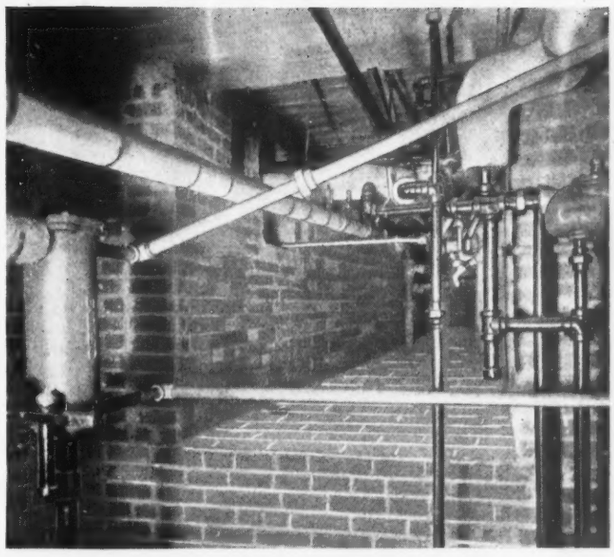
The evolution of standard plants for bottlers of Coca-Cola is excellent testimony to the value of scientific construction planning for all branches of the food industries. In the solution of specific problems of efficiency and sanitation, many will find a striking similarity to problems of their own. Of wider significance, however, is the general procedure by which a group of manufacturers with a common endeavor gained for themselves the benefits of co-ordinated judgment. For branch plants of single organizations, as well as for other plants in co-operating groups, the possibilities of similar means for obtaining valuable conformity will be apparent.—*The Editors.*

then on, it was a matter of conferences, blueprints, materials, and cost estimates. The committee would tear up blueprints almost as fast as the draftsmen could prepare them. Building materials were inspected, building material experts were interviewed, laboratory tests were made, and finally complete sets of plans for four sizes of plants were accepted.

Before the committee released these plans, before it could be sure that they were right, it built an experimental plant with the co-operation of an actual bottler to see what the result of its efforts would be like in fact. Even after the experimental plant had added its lesson to the rest of the information, there was nothing rigid or inflexible about the standards. Constant changes and improvements in design and material have, and still are, taking place, to keep them in step with best practice.

The four standard plants on which attention was finally concentrated were designed to provide the four capacity ranges that appeared, in the light of previous experience, most suitable to various types of distribution areas. They range in cost, exclusive of land and bottling equipment, from $10,000 to $40,000. Plant No. 1 was designed for a one-head automatic or semi-automatic machine with a capacity of 300 cases per ten-hour day; plant No. 2 for a full automatic machine at a capacity of 600 cases per day; plant No. 3 for two full automatic filling machines from one soaker, or for one 32-spout low-pressure machine, at a maximum capacity of 1,200 to 1,800 cases, and plant No. 4 for one low-pressure machine as a minimum and two as a maximum with a 2,000 to 4,000 case per day capacity.

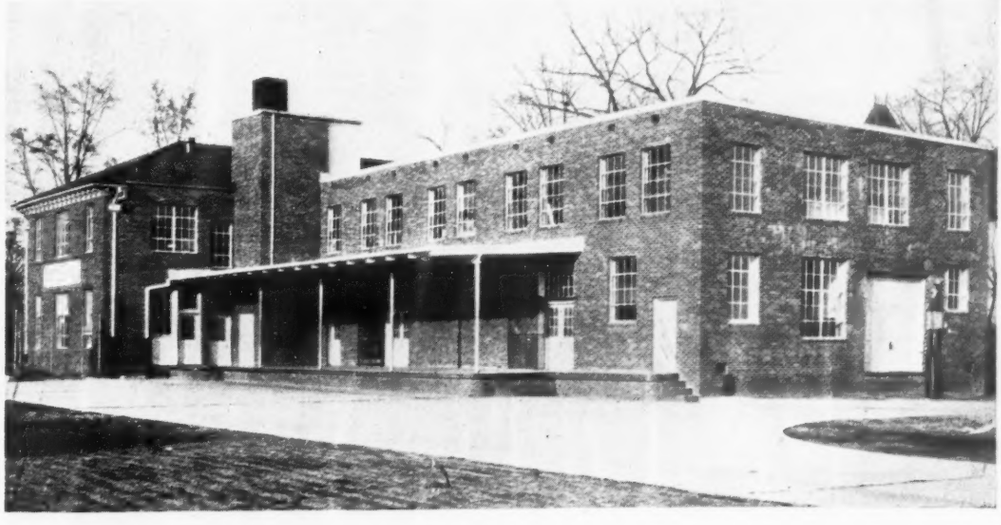
In choosing a lot location, the obvious requirements that it be located near the center of distribution and near suitable traffic arteries are not the only points to be balanced against its cost, the study brought out. Due regard to the character of a neighborhood, avoiding unsightly and insanitary locations, and thought to the advertising value of an attractive location also are emphasized. Even for the smallest plant, it is urged that no lot less than 100 ft. front and 150 ft. deep be chosen to provide for air, light, garage, courtyard, and for building expansion. A corner lot, which although more expensive, provides better light and ventilation, greater accessibility, the possibility of two driveways, as well as added publicity, is urged for the plant. The loading platform is placed on the inside of the lot. This not only conceals from the public view the least attractive part of the building but brings into greater prominence the operating machinery and increases immunity from prowlers and loafers.



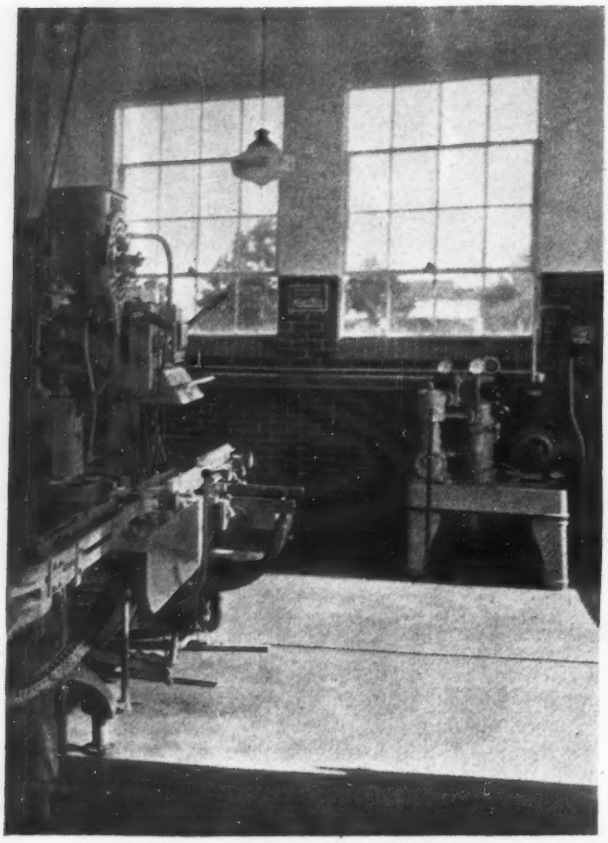
Overhead piping is eliminated in standard plants by the use of pipe trenches extending from the boiler room under the bottling floors

In the design and arrangement of the buildings themselves, operating efficiency, sanitation, and real economy —that is, the lowest initial cost consistent with the most economical operating cost over a reasonable period—were paramount factors. The value of publicity, however, was also kept in mind in planning the plants. Not as an ostentatious gesture, but because it has been found to pay in cold dollars and cents, plants were designed not only to be clean but to make this cleanliness apparent to the general public.

In drawing up specifications for the standard plants, building materials that were universally available had to be chosen. This applies not only to the major classifications of materials but in some instances to the subclassifications; for instance, in the case of brick, the selection of color and texture had to be considered from this standpoint. The same principle had to be kept in mind in specifying tile, vitrolite, limestone, and the like. The value of the uniformity produced from adherence to such standards, even in the face of the possibility of obtaining



Rear view of the Gadsden plant shows arrangement of loading platform inside the lot. Note that windows and door at the left provide office control for loading operations



Elimination of window sills and floor joints in the bottling room was found to aid in maintaining high standards of cleanliness at the "experimental" plant at Elberton, Ga.

cheaper materials in restricted localities, seems well worth while.

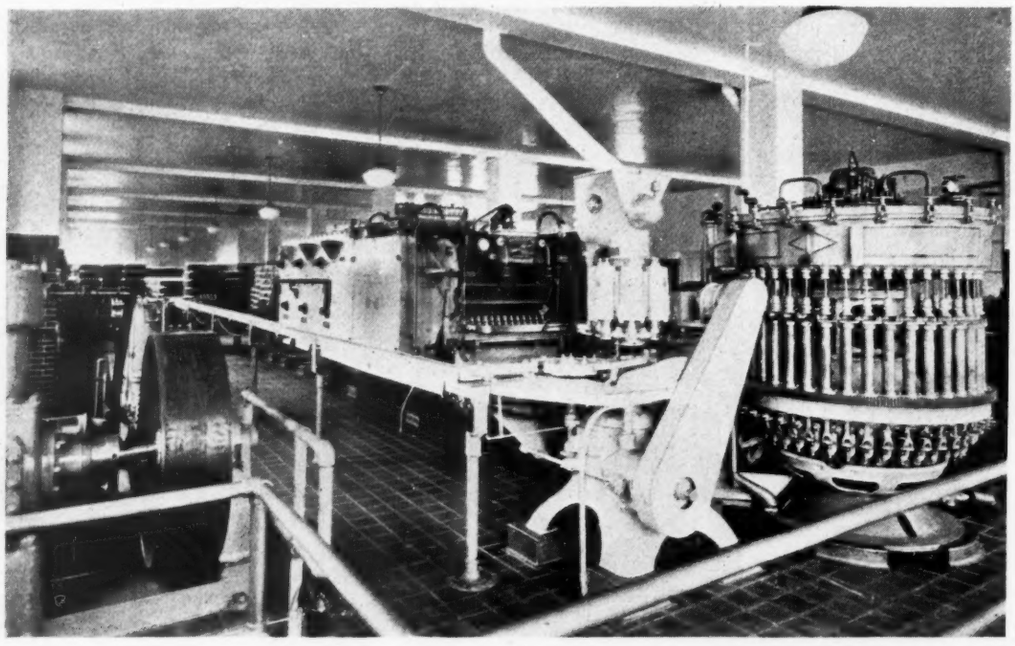
Every material selected had to be considered from the standpoint of whether or not it could withstand the severe and peculiar conditions to which it would be subjected. Floors that would stand up under contact with both acids and alkalis had to be specified. They had to drain well, and both be and look clean. The walls and ceilings had to stand up under condensation containing appreciable quantities of alkali, and the walls, in addition, had to be able to withstand abuse from floor trucks and cases. In the bottling rooms of the two smaller plants, the plans call for floors of special acid-proof cement without expansion joints, hardened and colored to match the wainscoting. Tile floors are specified in the bottling rooms of the larger units. Red pressed-brick wainscoting with a high gloss finish and absolutely impervious to moisture is called for, and perfectly smooth walls and ceilings, enameled to give a high gloss, are required.

One of the outstanding features of the standard plants is the use of pipe trenches. In the old type plants, the large amount of piping necessary in bottling factories hung from the ceiling and was an unsightly obstruction to light and ventilation and a dirt catcher. In addition, the maintenance cost was high, as the piping had to be painted frequently, and whenever any repairs were made to the piping, it usually was necessary to repaint the ceiling. By installing a pipe trench from the boiler room extending under the bottling floors, with the necessary laterals, piping is made available for repairs or changes without damage to the walls. All buildings are designed to carry low insurance rates without the use of sprinklers. A heavy galvanized drip pan is provided under the cold water storage tank on the second floor to insure against any possible leakage and damage to the ceiling.

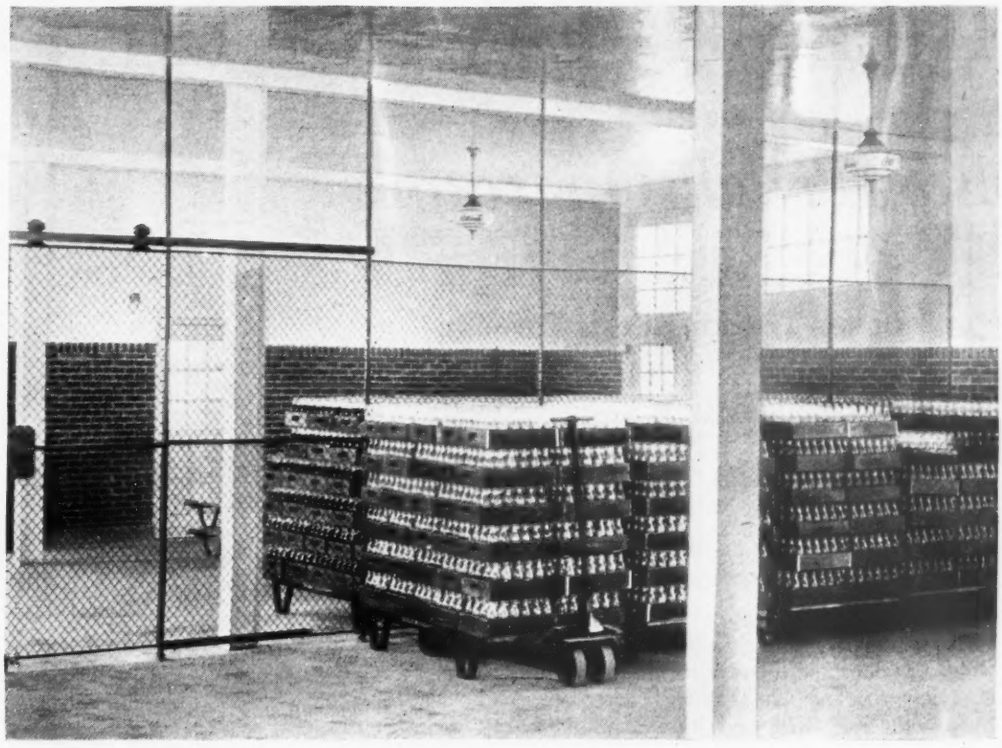
Basements are provided for boiler purposes only, it being the opinion of the committee that basements for other purposes are undesirable in food factories. The posts inside these plants supporting the second floor and the back part of the roof are so spaced as to have real utility value. They can be used for support of gas drum connections, as posts for the fence separating bottling shops from storage rooms, and the like.

The window heights are carefully arranged to allow storage in front of them without obstructing light or ventilation. In older plants, empty bottles had a way of roosting on window sills along with tools, oily waste, and other odds and ends. We solved this problem by eliminating window sills entirely.

The layout for all the plants provides perfect office control, giving an unobstructed view of both bottling



Bottling room at the Gadsden standard plant showing tile floor and freedom from overhead piping. The buildings are designed to carry low insurance rates without the use of sprinklers



Fenced-off stock room at the "No. 3" standard plant at Brownwood, Texas. Lift trucks are used for inside transportation. Walls and ceilings above the brick wainscoting have a high gloss finish; window heights are designed to avoid obstruction of light

machinery and loading platforms. In each instance a door leads directly from the office to the loading platforms. The only entrance to the plant for visitors also is through the office. Screen doors provided for the opening leading from the bottling and storage rooms to the loading platforms automatically slide shut and lock unless actually fastened open. The door from the shower and toilet rooms opens only on the loading platform. One toilet is provided in Plants 1 and 2, and two in Plants 3 and 4. Shower baths are provided in all but the smallest plant.

Although machinery layouts are given in the plans, they are more or less flexible, as strict specification of the particular make of equipment has not seemed advisable. The lift-truck platform method of inside transportation was adopted by the committee in designing the plants, because it seemed to them that it was best from the standpoint of sanitation, convenience, and cost.

In the creation of the standards, more than $10,000 was expended in tests, architects' fees, and the like. Coca-Cola bottlers desiring them pay a nominal fee, less than 0.5 per cent of the estimated cost of the buildings, for the use of complete plans and specifications. Includ- the No. 2 plant experimentally built, eight completed standard plants are now in operation. Ten others are standard in most respects. Two completely standard plants are under construction and ground will be broken for two others in the near future. More than 25 plants have made use of the standard plans to some extent. Supplementary standardization work, on such matters as stationery and signs, truck painting, and construction of beverage cases, is also being done by the committee.

Floors of impervious tile and vitrolite wainscoting aid syrup-room cleanliness

INCENTIVE WAGE PLANS

For Truck Operators

Lower Trucking Costs Through Better Driver Efficiency

By F. E. SPOONER
Maplewood, N. J.

A neat uniform makes a good impression upon the customers, whose sole contact with a company is often with a truck operator

BECAUSE the motor truck driver often is the main point of contact with his employer's customers, considerable thought has been given the problem of evolving a wage plan that will attract the right type of man, will hold him, and induce him to work with the utmost interest and loyalty. It is not only necessary to attract men who are smart, who have good personality, good appearance and are able to speak intelligently, but men who are energetic and willing to give high-pressure service. Men of this type can most certainly be obtained, but it does not necessarily follow that they will employ these qualifications to their fullest extent. There must be some incentive to spur them on. Energy must be induced. Hence, to keep up the driver's interest in the welfare of the company, its business, equipment, etc., some mutual plan whereby the driver can be made to feel that he is an important unit in the organization and which will enable him to participate in the profits in proportion to his effort must be devised.

Some fleet owners, as is indicated in a recent investigation, have given this subject much consideration. Many interesting and valuable viewpoints are revealed.

Some companies prefer stipulated salaries with commissions on sales; others use the same combination with an additional bonus for exceeding special sales quota; some employ straight salary and bonus only; some purchase trucks for their drivers on a financial basis and practically set them up in business on a contract basis; and some supply the trucks, fuel, etc., and sell the goods wholesale to the driver, who is bonded for the return of the day's receipts or unsold goods.

In addition to these major plans, various minor and independent efficiency-inducing plans are frequently used, such as special prize contests, bonuses for the return of bottles, containers, etc.; non-accident awards and extras for good appearance and condition of truck equipment. Where the drivers are uniformed, enterprising management has supplied large mirrors on which are noted the various pieces of apparel, etc., all for the purpose of stressing personal appearance.

Of the plans outlined, the combination salary and commission plan is most popular. Companies operating strictly commission plans are rare. It is the opinion of many that it is difficult to attract men on a purely commission basis.

Incentive wage plans offer many advantages. Where volume is concerned, greater efficiency is obtained, greater sales are made, customer complaints are reduced, accounts are more regular and company standards, relations and service are improved.

Such a general improvement is obvious: a higher-caliber man is attracted, one who realizes that his income depends on service, courtesy, and co-operation, and who capitalizes these fundamental business elements. Moreover, if the plan is right, he stays with the company.

In a study involving 21 companies using driver-incentive wage plans, incomes were found to average about $40 per week, the range extending from $25 to $90. The range of income was slightly higher where the trucks were owned by the drivers and when extra bonuses were given.

While most incentive wage plans include the establishment of some kind of quota for sales and the payment of a commission or bonus for sales over and above this quota, different distributing and handling conditions between the various vocations in the afore-mentioned study call for different detail treatment.

One large food retailer supplies and maintains the trucks for his drivers and also equips them with uni-

forms. The latter are kept in repair and pressed for $1 a week. A guaranty of $35 income per week is given until the driver is established on his route. After his route is built up, the driver has the right to go on straight commission. He purchases his supplies at wholesale prices and is bonded for the day's withdrawals from the plant. If at any time he is discharged, his successor must pay him for the book value of his route. In order to speed up his deliveries, each driver is supplied a ready change maker.

IN another industry, two companies employ salary and commission plans and two set their drivers up as independent owners operating their trucks under a contract arrangement. Inasmuch as each of the four plans differs from the others in many aspects, a brief outline of each is herewith given.

Driver-salesmen of one company receive a straight salary of $5.83 a day, or $40.81 for a 7-day week. Commissions are paid on the sale of a certain amount above a quota figured to cover the daily salary requirement. In addition, an extra bonus is earned by exceeding the weekly records. The men are stirred on to even greater effort through the scheduling of monthly prize contests twice a year. Winners receive several cash prizes ranging from $100 down, awarded at a special banquet to which the whole staff is invited.

A certain week, invariably a good one, is selected. Then the sales of each man on the staff are multiplied by four, which product forms the basis upon which the percentage increase of each salesman's sales for the contest is determined. The contest brings results; in fact, the entire incentive wage plan is largely responsible for a big increase in sales.

Another company uses the salary, commission, and bonus plan of compensation. Besides enabling the company to employ steady, high-grade men, this plan has been responsible for sales increases and efficiencies. These men receive a straight salary of $27 a week plus a bonus of $3 for Sunday work. Commissions are on a flat-rate basis and bonuses are on a basis of returned containers. Savings in replacements on the containers more than cover the bonuses.

Driver-ownership of trucks, according to another company, has solved its delivery and distribution problems. None of the trucks is the property of the company but all belong to the drivers. The company, of course, helps to finance its drivers in making purchases. While the company assumes no responsibility for the cost of operating the truck equipment, it does require that it be maintained in good condition and be of neat appearance. The trucks are serviced by their owners in any manner they see fit and fueled at their expense. The company pays each driver a flat rate per unit for deliveries.

Among the advantages of the driver-owner plan are the elimination of company maintenance of trucks whose drivers might not be careful with their equipment, elimination of all cost-keeping, and increased sales.

In regard to the foregoing, it might be mentioned that the bodies are owned by the company. These are painted and lettered at regular intervals at the company's expense. Each driver is required to build up a reserve against which the company may draw.

Some companies question the advisability of combining the function of driving and selling. One company, for example, has special salesmen to cover the territory, while drivers do nothing but deliver. This company has a wide variety of products, and in view of this, it is contended that the drivers cannot possibly provide 100 per cent service to customers. It has been found that orders obtained by the driver are at best only estimates of the demands made of him on the preceding day.

There are any number of variations in bonus plans which are now being used with success. Every system differs from the rest, as no two sets of conditions are alike. A few outstanding examples follow.

For example, suppose a driver through indifferent service were to shorten the life of a truck, say, two years, or an equivalent in financial loss of from $1,000 to $1,500. Such a loss could be cut down materially were some incentive given the driver to minimize accidents, neglect, or careless operation of the vehicle.

A dollar or two per week bonus to a driver for economy in fuel consumption, tire mileage, breakdowns, etc., will get results if it is paid only when the corresponding saving has been shown in the operation of the vehicle.

A bonus plan can be based on any item of truck operation that is under the driver's control. The following eight items cover these completely, and a suitable combination might be chosen from them as a basis for a bonus plan:

1. Gross loads hauled per day or week.
2. Number of miles traveled per day or week.
3. Time consumed.
4. Repair expense.
5. Vehicle life.
6. Tire cost.
7. Fuel, oil, and grease.
8. Idle truck time (loading and unloading).

A bonus plan being tried for the first time should be as simple as possible. Trying to do too much at the start frequently is responsible for failures.

One simple plan is to divide with the driver on a 50-50 basis all savings. Thus a standard would be fixed to represent an average yearly repair cost for a vehicle or an average consumption of fuel, oil, or tires. At the end of a year's time the actual repair costs or other costs would be computed and, if the amount were under the estimated total, the driver would be entitled to a bonus.

In regard to the foregoing plan, it might be well to mention one possible weakness in connection therewith, and that is the possibility of a driver being tempted to neglect reporting minor troubles which, if not taken care of, might develop into shop work of a major character.

A knowledge of costs, which must be accurate and complete, is absolutely necessary for bonus plans. Only through such knowledge can a truck system be studied for purposes of a bonus plan.

One company through the use of its costs has worked out a bonus plan whereby tire, repair, and fuel costs are considered. The tires used by this concern are guaranteed for 7,000 miles. The driver is given 33⅓ per cent of the saving he makes on tires which run over the guarantee. As for repairs, bonuses amount to $15 and $10 a month to the drivers showing the lowest and next lowest repair costs for their trucks, provided these trucks have gone at least 5,000 miles. These awards also take into consideration mileage, tonnage, engine condition, and other factors. Similar consideration is given in the fuel bonus award, which amounts to $3 a month for the lowest consumption per mile.

It is well to remember that where repair expense is the basis for bonus awards, it should be ruled that drivers are not to make adjustments or repairs unless they are trained mechanics. If this rule is not observed, more harm than good will be done by inexperienced men tinkering with the trucks when things go wrong.

Applying wax coating to oranges by means of a spray machine that causes them to be enveloped in a fog of the coating material as they pass by on a conveyor

PREVENTING DECAY AND SHRINKAGE

In Citrus Fruits

By EARL D. STEWART
Food Industries Staff

SINCE 1905, governmental and other agencies have given attention to the problem of preventing decay in citrus fruits in transit to, and after their arrival at markets. While much has been learned about the causes of decay in these 25 years and while improvements in packing-house practice and shipping methods have cut down the losses, there is still room for improvement. As late as 1924 Fawcett found decay in lemons ranging from 5 to 40 per cent and averaging 10 per cent in sixteen shipments arriving at Eastern terminals (Fawcett and Lee, "Citrus Diseases and Their Control," p. 538, McGraw-Hill Book Company, 1926). Again in 1926, the same author found shipments of oranges from a few houses that showed as high as 50 per cent infection with blue and green molds (California *Citrograph,* November, 1926, p. 33).

The causes of decay are variable, but fortunately some of the more important are preventable or at least their incidence is reducible. In the sixteen shipments mentioned above, 81 per cent of the decay was due to Alternaria rot and common green and blue-contact molds. Both of these kinds of decay can be greatly reduced by careful handling, and by proper treatment can be practically eliminated.

Other troubles leading to decay, such as internal decline (endoxerosis), are beyond the control of the packer except by rigid sorting, frequently impossible, as the defect is not externally visible. The control of physiological defects lies in improved cultural methods rather than with the packing-house methods.

The earlier investigations of citrus fruit decay during shipment were directed largely at common green mold and blue-contact mold. Owing to the very crude methods of picking and packing in vogue 25 or 30 years ago, this type of decay was very common—almost universal, in fact—and frequently caused losses of 30 to 40 per cent. A comparison of picking and packing methods then and now is highly instructive in showing the progress of the citrus fruit industry. (The U.S.D.A. bulletins mentioned later on in this article, B.P.I. No. 123 by Powell; U.S.D.A. No. 63 by Stubenrauch, Ramsey, Tenny, *et al.:* and Farmers' Bulletin 696 by Ramsey give good descriptions of former practices, in both California and Florida.)

Common green mold and blue-contact mold (the generic name "blue mold" is commonly used for both) are due to infection by spores of *Penicillium digitatum* Sacc. and *P. italicum* Wehmer. They are frequently associated and their spores are everywhere: in orchards, packing houses, and markets. The spores enter the fruit through injuries to the skin, and in this favorable medium the mycelium grows rapidly. If the humidity of the atmosphere around the fruit is low, the fruit wrinkles to a dry mummy; if the humidity is high, the fruit finally flattens to a soft decomposing mass, due to other mold and bacterial infections that enter when the fruit has softened sufficiently.

In 1908, G. H. Powell, then pomologist in the

Department of Agriculture, in charge of fruit storage and transportation investigations, published the results of his investigations of blue mold as Bureau of Plant Industry Bulletin No. 123, entitled, "Decay of Oranges While in Transit From California." This was one of the first studies, if not the first, on the subject, and Powell's observations as to the methods and results of blue-mold infection are still recognized by citrus experts as accurate and authoritative. His recommendations for control, however, have been amended.

Powell showed conclusively that obvious mechanical injury hastened blue-mold decay and that careful handling and sorting out of visibly injured fruit would cut down decay losses. He also showed that refrigeration in transit when combined with careful handling reduced losses considerably.

Powell says: *"The necessity for washing the fruit should be avoided.* [Italics Powell's.] It has often been suggested that the blue mold might be killed by a disinfectant in the wash water. . . . This does not appear from preliminary studies to be promising or advisable." He then goes on to say that such a remedy, if successful, would place an undue premium on careless handling—a sage observation that can still be remembered with profit in this day, when Powell's recommendation as to washing has been discarded.

At the time of this and later studies only about one-third to one-half of the citrus fruit packed was washed. The method was crude, usually a preliminary soak followed by brushing, and the fruit was often insufficiently dried. The soaking water was infrequently changed, and after a few boxes of fruit had passed through, it became a wonderful blue-mold inoculum. The findings of Powell and others on the increase in blue-mold infection after washing are not to be wondered at; rather, it is a wonder that the fruit was not a complete loss.

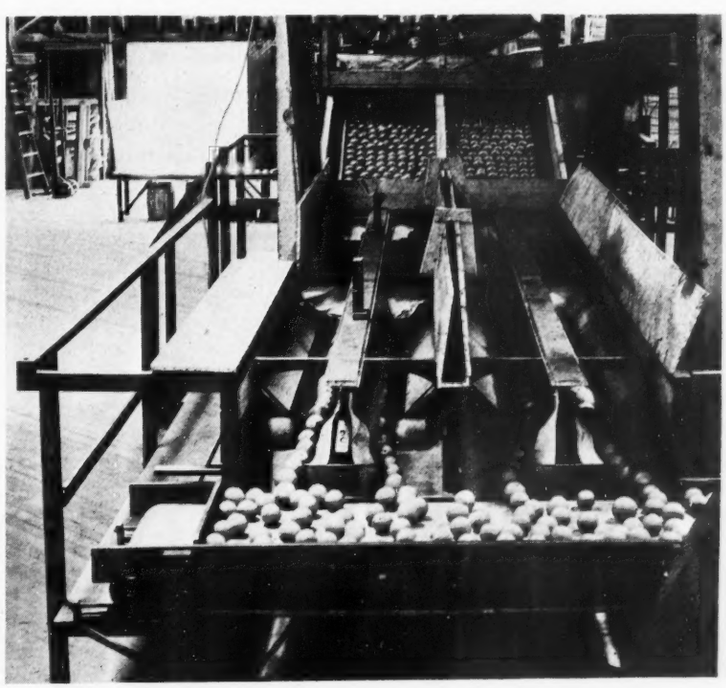
The dicta of Powell—namely, careful handling and refrigeration—undoubtedly helped a bad situation. But careful handling can be only approximately attained and a mechanical injury does not have to be obvious to the naked eye for blue-mold spores to find entry through it. Nor has refrigeration been an unqualified success.

Various schemes of control were tried without success. Introducing active disinfectants into the wash water was suggested, since it was known that copper sulphate was effective against brown rot of lemons. (Pythiacystis rot, controlled by 1 to 2 lb. of $CuSO_4$ to 1,000 gal. of water. Calif. Agri. Expt. Sta., Bull. 190.) Blue mold was not affected by copper sulphate and indeed the opinion was expressed that "any solution used to destroy them [blue mold spores] must be of sufficient strength to injure the surface of the fruit" (Bulletin 63, p. 26). Among the weird disinfectants suggested may be mentioned one composed of resorcinol, one part; terpin hydrate, two parts; copper sulphate, two parts; sodium salicylate, two parts; sodium benzoate, two parts; ammonium carbonate, four parts; liquid petrolatum, one part (U.S.P. 1,047,013, about 1913).

On Aug. 13, 1923, Ernest M. Brogden, of Santa Monica, Calif., and Miles L. Trowbridge, of Palms, Calif., filed application for a patent covering the use of borax solutions as a treatment to prevent blue-mold decay. This application was granted March 10, 1925, as U.S.P. 1,529,461, and is the basis of the "Brogdex" method of treating citrus fruit to prevent blue-mold decay and to reduce shrinkage from loss of moisture. The patent is quite long (specification and claims cover eight pages of text), but the essential points are (1) the soaking of citrus fruit in a borax solution (5 per cent) at 115-120 deg. F. and (2) the coating of fruit so treated with a wax film. Both processes and treated fruit are covered in the claims. The process is controlled by the Brogdex Company, Los Angeles, Calif., and Winter Haven, Fla., and is available to fruit packing houses by license agreement.

Following the announcement of the Brogden and Trowbridge process in 1923 investigations were made by many workers on the effect of the process. All agreed that it had a most salutary effect in inhibiting blue-mold decay. Among them may be mentioned the work of Fulton and Bowman (*J. Agr. Research,* 28, No. 9, p. 961) and Barger and Hawkins (*ibid,* 30, No. 2, p. 189). Following the issue of the Brogden and Trowbridge patent, a great many others were issued covering the use of salts having an alkaline reaction in solution. Thus, a series of patents was issued to Fulton and Bowman covering salts of lithium, and very recently to Barger covering salts of cadmium (Food Ind., July, 1929, Vol. 1, p. 468).

After receiving a coating of wax, the oranges pass through this brush machine, which spreads the wax evenly over the surface and gives it a high polish



Borax, however, remains the prophylactic most widely used. Its efficacy has been proved by several years of actual use, it is fairly cheap, universally obtainable, and preparation of solutions is easy.

In the autumn of 1923, arrangements were made with the Walnut Fruit Growers' Association, Walnut, Calif., to conduct a large-scale commercial test of the process. The entire pack of this house for the 1923-24 season, amounting to

265 cars of oranges (about 85,000 boxes), was given the borax treatment for blue-mold prevention and the wax film coating to reduce shrinkage. Ice was not used on any shipment. At the markets the fruit was inspected in the usual way and sold for top prices in the open market. The official inspection reports showed that the entire 1923-24 pack averaged less than 0.5 per cent decay upon arrival. Only five cars showed more than 3 per cent decay with a maximum of 6 per cent in one car only.

The Walnut packing house in 1929 began its sixth year of using the system, and the manager of the association, James Wolstencroft, states: "Our shipments . . . are going forward for the sixth year with no icing except where we have been forced to, and with practically no decay."

The cost of icing varies with season and distance to market, and the necessity for it varies with the season and condition of the fruit. In midwinter the fruit may have to be protected from freezing during transit. In summer shipments icing becomes necessary, as well as in other seasons when the fruit is overly ripe or has been held long in storage. For estimating purposes, $50 a car is considered a fair figure for refrigeration charges. Thus one shipper estimates that by shipping 800 cars of Valencias under ventilation only, in May and June, there was a saving of $40,000; certainly worth while.

At the present stage of its development the machinery used in the system consists of two parts: the soaking tank and the oil fog and polishing machines. In the soaking tank the fruit is in contact with a solution of borax of 5 per cent or so at 115-120 deg. F. for several minutes. This temperature is high enough to aid materially in cleansing the fruit and at the same time help in the destruction of rots such as *pythiacystis* or brown rot. It is not hot enough to destroy blue-mold spores nor will it destroy other organisms, if borax is omitted, unless the soaking is unduly prolonged.

Before passing to the dryer the fruit may be sprayed with clear water to rinse off excess borax. This is not always desirable, especially if "weak" fruit (fairly ripe fruit picked late in the season) is being treated. The quantity of borax adsorbed on the surface is very small and, since the skin is not usually eaten, will ordinarily be of no importance, dietetically. Fulton and Bowman (*J. Agri. Research*, 28; 961-68) found that an orange of average size would remove 1 c.c. of a 5 per cent borax solution. If one-half of this drains off the quantity of borax left on the orange is 0.025 gm. (0.4 grain). The therapeutic dose of borax is given as 0.750 gm. (12 grains).

After drying, the fruit enters a heated chamber at about 180 deg. F. Formerly these chambers were kept hot by small, gas-fired furnaces, but the newer machines are heated electrically by the standard "helicoil" heater of the General Electric Company and equipped with thermostatic control. At the entrance to the "fog" chamber are placed the jets of the fog machine. This consists of a small motor-driven air compressor and an electrically heated oil reservoir. The oil used has varied in composition as improvements were made but is essentially a solution of paraffin in a white, odorless, and tasteless mineral oil of low viscosity.

The hot oil fog "condenses" on the cool fruit, which then rolls down a series of revolving horsehair brushes about 7 or 8 ft. long. The whole apparatus is kept hot and the brushes spread the wax layer over the fruit. The fruit leaves the chamber highly polished and quite warm, ready for grading.

While the effects of the Brogdex treatment can readily be made apparent (see photographs) the reasons for its effectiveness are not so evident nor are they fully understood. Assuming that the fruit is sterilized, at least against mold and rot spores, by the borax soaking, no particular effort is made to keep it so; in fact, any such effort would be well nigh impossible under the mass-production methods of the modern packing house. Fulton and Bowman (*loc. cit.* p. 964) showed that borax also has an inhibitory effect on the growth of Phomopsis and Diplodia stem end rots. The fruit usually is sprayed with clear water, which probably contains spores, after soaking; it is exposed to currents of packing-house air,

Ninety-five days before this picture was taken the oranges on the left were disinfected and wax-coated, while those on the right, from the same batch, have not been treated. The difference is readily apparent

After 137 days the treated lemons in the left-hand compartment are in fine condition, while the untreated fruit in the right-hand compartment shows much shrinkage

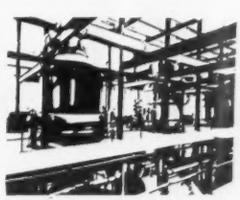
known to contain spores, for several minutes during drying. Even if the spores originally present were destroyed during the soak, the fruit must receive quantities of them on its surface before it reaches the packing box.

It is possible that the reason lies in adsorption of borax by the skin of the fruit. It is well known, for example, that an excessive quantity of boron in soil or irrigation water injures and eventually kills plants growing in the soil. Perhaps the element boron has a similar effect on the lowly plants causing decay. By sealing up injuries so small as to be invisible the wax coating reduces the probability that floating spores will find a place suitable for growth. This is borne out by the fact that borax-treated fruit will decay if the inoculation is made deep enough or if it is grossly injured after treatment. The system is not a panacea or a substitute for careful sorting and handling, but it does protect against microscopic injuries inevitably present and not detectable.

Some have feared that the wax fiber would induce anaerobic respiration in the fruit and hence cause disagreeable flavor changes and internal breakdown. This fear has not been realized in practice; actually the coated fruit, because of its greater juiciness, is judged superior to untreated fruit. As to internal decline, treated apples show less of this trouble than untreated apples.

The reason for this probably lies in the extreme thinness of the film, which is of the order of 0.001 in. From the results obtained in practice it appears that films of this thickness do not interfere with respiration to the degree that it becomes anaerobic, but the film does reduce the moisture loss and probably slows down the rate of respiration. For this last reason the ripening process is retarded as it is by refrigeration; hence the possibility of uniced shipments.

Regardless of what explanation is put forward to explain the effects of the system, its results speak for themselves. Treated fruit, heavily inoculated with mold spores and placed in an incubator, remains firm, fresh, and alive looking, while untreated controls in the same environment shrink and dry up or become soft, decomposing, disgusting masses of pulp. The photographs accompanying this article show more vividly than words can describe the effect on shrinkage, and the increasing number of packing houses—both apple and citrus fruit—using the process testify to its commercial value.



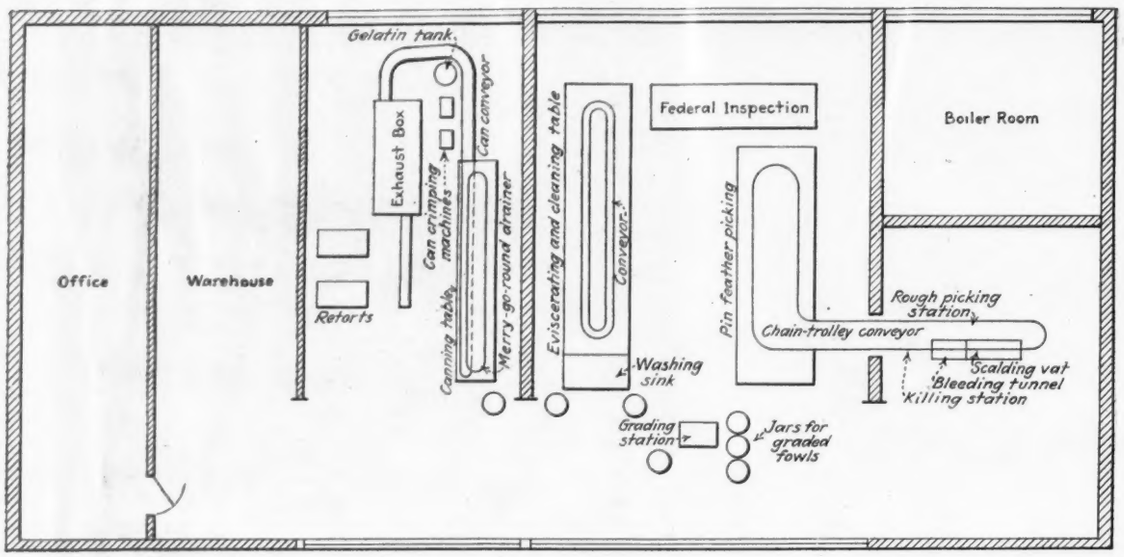


Fig. 1—Floor plan of chicken cannery, showing conveyor layout

Efficient

STRAIGHT-LINE PRODUCTION

Depends on Conveyors

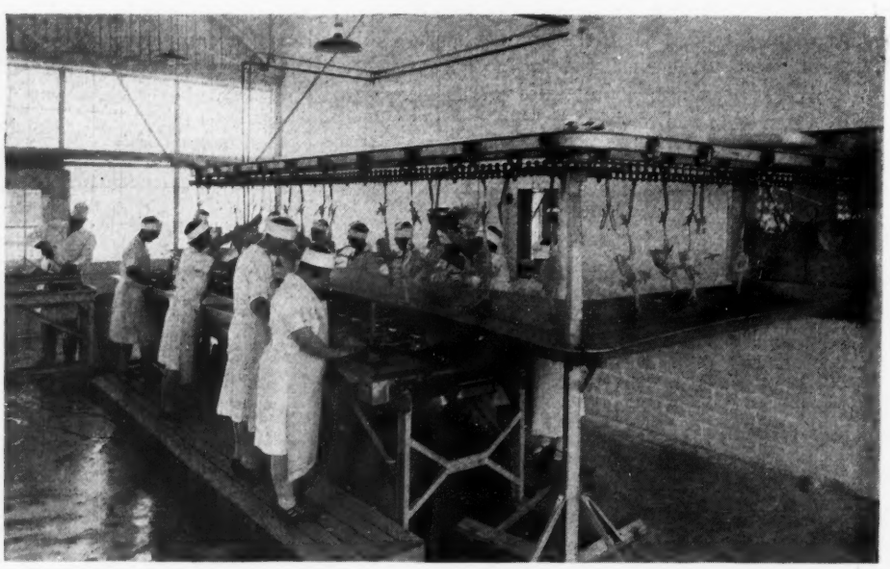
WHAT is commonplace in some industries is unknown in others. This is well illustrated by the statements heard on so many sides a few years ago when straight-line, quantity production first began to characterize the manufacture of automotive products. Many who investigated the methods used and the results obtained said, rather enviously, "Well, that's all right for Henry Ford, but it can't be done in my industry."

Of course, such comments were not made in many branches of food processing, where straight-line methods that take full advantage of machines and reduce manual labor to a minimum, had long been known. Grain milling, milk pasteurizing and bottling, the manufacture of carbonated beverages, and the canning of some foods are examples of industries that have for many years effected combinations of the available designs of processing equipment and conveying machinery, so that work moved in large quantity through straight-line, continuous processes, requiring relatively small amounts of human labor.

However, there still are many branches of food manufacture that have not gone very far in applying these methods, while many others, although fairly well equipped, do not yet use some of the later developments. The quickest way these plants can bring themselves up to date is by studying some of the plant layouts put into operation in the last year or so.

Of particular utility in adapting straight-line methods to a wide variety of industries are the many new types of chain conveyors with special attachments that have come into use in the past five years. How these are

Fig. 2—Removing pinfeathers. During this operation the birds are removed from the chain-trolley conveyor that extends into the killing room to the right



employed is well illustrated in the layout and equipment of recently built plants. Conveyors of this type are employed, for example, in the plant of the Runnymede chicken cannery, at Reseda, Calif., which started operations during the summer of 1930. As many of the operations in chicken canning must be performed by hand, the conveyors serve the purpose of bringing the work to the workers at a steady pace, timed to suit the best speed of plant operation. The conveyor layout and the various steps in the operation of this plant, which will be briefly described, are shown in the accompanying floor plan and photographs.

The chickens for canning are removed from the crates and hung on an overhead chain-trolley conveyor by placing the feet in the outer loops of W-shaped conveyor attachments of heavy wire. The trolley rail extends through the wall into the next room, where the picked birds are removed. The live birds are placed on the trolley where it re-enters the killing and picking department.

The birds are killed as they are about to enter a short tunnel of galvanized iron about 6 ft. long, where they bleed without dripping blood over the killing-room floor. From the tunnel they are carried for one minute through a tank of moderately hot water (128-156 deg. F.) for scalding. This "semi-scald" makes picking easy, without discoloring or injuring the skin by partly cooking it.

The scalded chickens then pass around the end of the conveyor to where the pickers stand. The rough picking, so-called, is done here. No attempt is made at complete removal of all feathers, though for a bird with few pinfeathers the picking is substantially complete. Four men ordinarily do this work and can pick 420 birds an hour.

The rough-picked birds now move through a hole in the wall (Fig. 2) and pass before eight girls who remove the pinfeathers. The chickens are taken from the conveyor and hung up by a loop of cord during this operation or laid down on a wooden table, as may be necessary.

All pinfeathers having been removed, the cleaned birds are placed in Monel metal pans fastened to a multi-strand chain conveyor moving through a trough below the conveyor on which the birds were brought into this department. When the pans reach the end of the line the birds

Fig. 3—W. D. Hilton, federal inspector, examining chickens before canning. Diseased and emaciated birds, as well as those that are inedible for other reasons, are removed and condemned here

are removed, inspected, and singed by means of a gas torch. The singed birds are hung on racks to cool overnight before the remainder of the canning operations are completed. The empty pans on the return run of the conveyor are upside down. During this part of their travel they are sprayed with water and steam so that they are always clean and practically sterile.

The overnight hanging of the fowls allows them to cool and makes the flesh firm, so that they are more easily handled and cut. They are taken from the racks and laid on their backs in the pans of a conveyor similar to that already described. The first operation in eviscerating is to cut around the vent and remove the entrails but not to detach them completely. In this condition the fowls pass before a federal inspector, an official of the Bureau of Agricultural Economics.

Birds that have passed inspection are removed from the conveyor pans by a workman, who cuts off the heads and feet and then places them in the pans of another conveyor that carries them to the final cleaning operation. This conveyor is of the carrousel type and is mounted about eye-level, the pans moving around it continuously in the horizontal plane (Fig. 4). Women remove the birds from the pans, finish the eviscerating, remove the kidneys, lungs, etc., and then place the birds on the pans of another conveyor just in front of them at the level of the work table. At the end of its travel the birds are removed by two workmen, who wash them inside and out with a jet of water controlled by a foot valve. The pans of this last conveyor return to the opposite end upside down, being washed and steamed in transit.

Fig. 4—After inspection, the heads and feet are cut off and the internal viscera removed at this station. The cleaned birds are washed inside and out by the two men at the left

Fig. 5—Filling into cans. The chickens are removed from the draining conveyor at the right and weighed. The size of can used depends on the weight of the bird

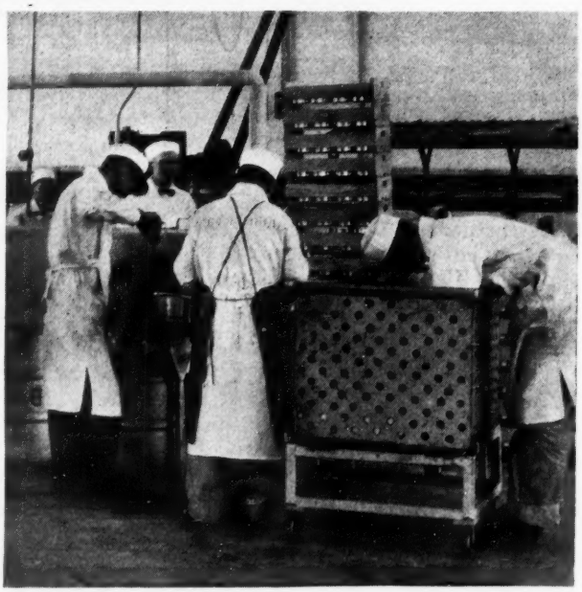
The washed and eviscerated birds are placed in 30-gal. stone jars mounted on casters, from which they are removed for the final inspection. The inside is carefully examined and small bits of tissue that may have escaped the previous workers, or that were inaccessible to them, are removed with long-handled artery forceps. Grading for quality and size is the next step. The graded chickens are again placed in the stone jars, which are then removed by truck to the next room, where the canning is done.

On removing from the jars the fowls are placed on heavy wire loop attachments mounted on a continuous chain-trolley conveyor, to drain thoroughly before canning. They are removed from this conveyor, weighed, and placed in oval cans, the can size being determined by the weight of the bird. Six sizes of cans are used. The neck, heart, and gizzard are placed inside the body cavity and the can is placed on a metal-mesh belt conveyor to be carried to the sealing machines.

After filling, the cans go through a number of operations before they are ready for the retort. The can used has a small opening in the top, where a cap is later placed, so that it is really filled from the bottom. As the cans pass the sealing-machine operators they take them from the conveyor, place a bottom on them, and grip it on with a machine similar to a double sealer. The joint is not airtight, however, and must be soldered. The next worker coats the seam with soldering flux and two others run a stream of solder around it. The can is now turned right side up on the conveyor and soon arrives at the gelatin filling station. Here it is filled with a hot solution of high-grade gelatin through the small hole in the lid. The small cap is next soldered on, leaving the can closed except for the vent in the cap. It now passes through the exhaust box and on emerging the vent is sealed with a drop of solder. Thus it takes eight, or at least seven, workers to seal the cans. A satisfactory double seamer for these large oval cans would be highly desirable.

The final operation is to cook the chicken in the cans in retorts for 45 min. at 250 deg. F., as required by the California cannery inspection law.

Fig. 6—The canning and cook room. The men are performing the final sealing operation on the cans



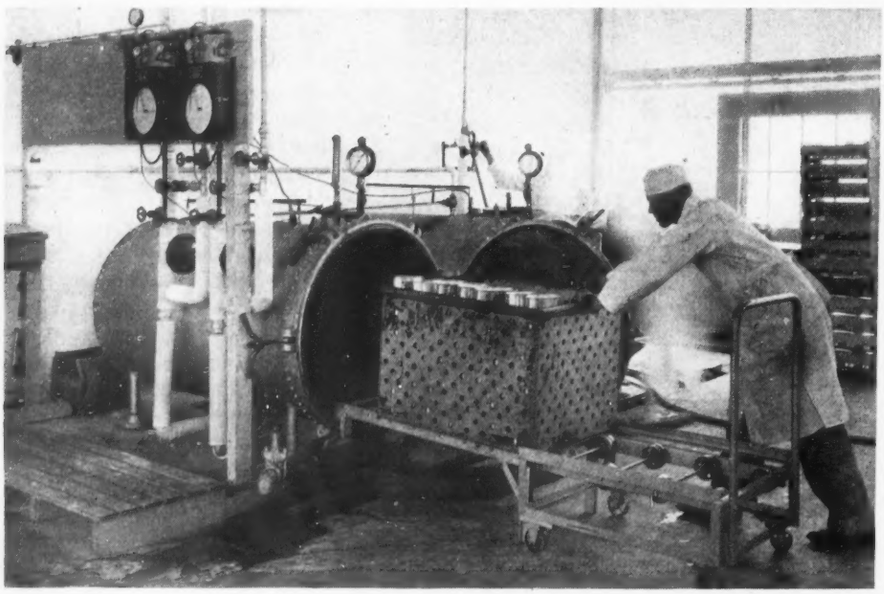


Fig. 7—Pushing the cans into the retort. The recording and control devices shown are necessary under the California cannery inspection law, as each retort load must be processed for a definite time and temperature set by the Cannery Inspection Service for the product being canned

PREVENTING BEVERAGE SPOILAGE

By Pre-Fermentation

By WILLIAM L. OWEN
Consulting Bacteriologist
Baton Rouge, La.

NITROGEN content is the limiting factor in the preservation of most fruit juices and beverages. As few fruit beverages can withstand pasteurization or the addition of preservatives without some impairment of flavor and color, a practical and economical method for the removal of nitrogen would be a great advance in the science of beverage preservation.

Unfortunately, no chemical means for economical removal of nitrogen without impairment of quality is available. The possibility of a bio-chemical method for rendering such products unsuited for the development of micro-organisms, however, was opened up by the brilliant researches of De Herelle in his work on the "bacteriophage" in human pathology. This work has led several investigators engaged in food preservation problems to look for the existence of such a method that could be applied to industrial practice. It is of interest not only to the beverage industry but to any industry desiring preservation of slightly susceptible products whose composition does not admit of drastic pasteurization or sterilization methods, and where it is undesirable to use chemical preservatives.

The results so far published have given considerable encouragement to further efforts in this direction. The most significant of these investigations is that of Vandecaveye[1] on the preservation of apple cider by the development of successive generations of yeast in it. He found that by growing three successive generations of yeast in cider and filtering after each successive fermentation period, practically all of the nitrogen of cider could be removed, and a practically non-fermentable product obtained. The percentage of nitrogen in the unheated cider, was found to be 0.098, which was reduced to 0.0196 after the first heating to 45 deg. C. and filtration.

In a problem of beverage spoilage recently submitted to me, the possibility of applying a pre-fermentation process to assure preservation appeared logical. The beverage in question was prepared from a natural fruit base and cane sugar, with added color and essential oils. Although its composition did not render it especially susceptible to fermentation, at certain seasons of the year the losses from spoilage were quite high. An examination of many bottles of the spoiled beverage showed sufficient yeast cells to indicate that spoilage was due to this class of micro-organisms. The spoiled beverage showed a characteristic appearance, the most prominent feature of which was the presence of a compact sediment on the bottom of the bottles and an unusually high gas pressure in the liquid. The coloring matter of the beverage appeared to have been absorbed by the yeast cells and to be concentrated in the yeast deposit in the bottom of the bottles. The results of a microscopical examination of beverage samples and of the inoculation of a sugar solution with a culture gave the results shown in Table I.

Table I—Yeast Found in Spoiled Beverage

Sample No.	Microscopical Examination	Results of Transfer to Sterile Sugar Medium Containing Peptone	
1	Many yeast cells in sediment	Fermenting in	4 days
2	Many yeast.....	.....	
3	Mold on top; many yeast in sediment...	Fermenting in	10 days
4	No sediment; many yeast.....	Fermenting in	5 days
5	Many yeast, very strong gas pressure..	Fermenting in	5 days
6	Many yeast.....	Fermenting in	9 days
7	Many yeast.....	Fermenting in	6 days
8	Few yeast.....	Fermenting	
9	Few yeast.....	Fermenting	

Although these and many other examinations of the spoiled beverage were convincing evidence of the significance of the presence of yeast, inoculation of the unspoiled beverage with some of the yeast obtained from the fermented bottles was not consistently successful. The explanation for this variation was found in the subsequent work.

Table II—Nitrogen Content of the Beverage

Sample No.	Total Nitrogen (mgs. per 200 c.c.)
1	4.00
2	3.10
3	4.15
4	3.40
5	3.40
Average.....	3.61

The nitrogen content of the beverage (see Table II) was found to be so low as to indicate that it was probably the limiting element in the susceptibility of the beverage to fermentation. In order to determine the effect of the nitrogen content more definitely, however, the following experiment was carried out:

To 10 c.c. portions of the beverage in test tubes were added amounts of a nutrient solution containing 1 per cent peptone, varying from 0.1 c.c. to 0.5 c.c. When these tubes were inoculated from a sample of the fermenting beverage it was found (see Table III) that the addition of nitrogen was all that was required to increase the rate of growth of the yeast in the beverage and to insure its fermentation.

When inoculation of the beverage was made in shallow layers, as in half filled Erlenmeyer flasks or even in half filled culture tubes, the beverage never showed any positive results from the inoculation in the way of fermentation. When the tubes or flasks were almost en-

[1]Vandecaveye, S. C., "The Effect of Successive Generations of Yeast on the Alcoholic Fermentation of Cider"; *Journal of Agricultural Research*, Vol. 37 (1928); p. 33-55.

tirely filled, however, and little or no air space existed, some fermentation was obtained from inoculation in almost every case. The explanation seems to be that under anaerobic conditions there was sufficient nitrogen to induce some fermentation, even without the addition of any nitrogenous material. This indicates that high carbonation of the beverage makes it more subject to fermentation by yeast than would be the case if the air were not so completely displaced by carbon dioxide.

If the nitrogen content of yeast cells be taken as 14.15 per cent protein[2] at a moisture content of 73 per cent, and the weight of a cell as 0.000,000,0005 gram (Matthews C. G., "Manual of Alcoholic Fermentation," page 55), we will have a theoretical production of yeast of 131,000 per c.c. in a beverage containing 4 mg. of nitrogen per 200 c.c. As one-half of the total nitrogen contained in the beverage is in the form of nitrates not readily, if at all, assimilable by yeast, the maximum yeast production in such a beverage would appear to be about 60,000, which corresponds roughly to the figures obtained.

Most of the nitrogen contained in the beverage is in the concentrate used in its preparation, and it was felt that there might be unequal distribution of the nitrogen in the bottles with a concentration of this element of nutrition in the sediment that settled out of the beverage.

Table III—Effects of Varying Amounts of Nitrogen on the Fermentation

Series	Treatment	No. Yeast Cells Per c.c. 4 Days	6 Days	7 Days	8 Days
A	Control	.....	55,000	55,000	55,000
B (1)	0.1 c.c.	56,000	1,200,000	1,200,000	2,240,000
B (2)	0.2	.....	880,000	880,000	1,760,000
C (1)	0.3	304,000	3,040,000	.....	20,000,000
C (2)	0.3	550,000	2,160,000	5,600,000	20,800,000
D (1)	0.5	1,200,000	4,080,000	20,000,000	33,200,000
D (2)	0.5	4,800,000	.....	19,200,000	24,280,000

To test this point, some of the concentrate was introduced into tubes and sufficient water added to bring the beverage to standard density. The tubes were then inoculated with a platinum loop of the yeast culture isolated from the spoiled beverage samples. At the end of nine days the yeast count on the well shaken samples showed 400,000 yeast cells per cubic centimeter, while a count from the top and bottom portion shows 80,000 and 3,800,000 per cubic centimeter respectively (see Table IV).

The quantity of concentrate used in the above experiment was larger than ordinarily used in the beverage, so the results are only indicative of the tendency of the nutrient material to be carried to the bottom by sedimentation, and to form a more ideal substratum for the development of yeast than would be indicated from the analysis of the finished well-mixed beverage. After fermentation has once begun, yeast cells developing in the upper strata of beverage slowly settle out and bring down with them additional amounts of nitrogen in the form of coloring matter and colloidal material contained in the concentrate.

The nitrogen content of the beverage under consideration was less than 4 per cent of the minimum nitrogen content of grape must as given by Leach.[3] It was less than one-tenth of the figures given by Vandecaveye for cider after the first heating and settling. With so small a percentage of nitrogen as a limiting factor, it appeared

[2]Although the nitrogen content of yeast may vary somewhat with the type of yeast and the composition of the substratum, we may assume this composition for general purposes.

[3]Nitrogen content of grape must, according to Leach's "Hand Book of Food Inspection," page 556 is: Maximum, 0.57 per cent; mean, 0.28 per cent; minimum, 0.11 per cent.

Table IV—Unequal Distribution of Yeast Cells

Days	Top	Bottom	After Shaking
9	80,000	3,800,000	400,000
12	680,000	10,800,000	.....
14	780,000	.....	2,180,000

feasible to apply a regulated initial fermentation that would eliminate the possibility of further fermentation in the bottled beverage.

In this pre-fermentation process, the concentrate was diluted with water to twice its volume, and 2 per cent of sucrose added. The solution was then inoculated with a pure culture of yeast and introduced into an Erlenmeyer flask fitted with an Alwood flask containing 80 per cent ethyl alcohol in the scrubbing chamber. The fermentation usually required several days, and its completion could be determined by the cessation of bubbles passing through from the scrubber. The yeast was then filtered from the solution by a Seitz filter, and the concentrate made into beverage.

Samples of this beverage were inoculated and kept under observation for some time to determine if they were still fermentable. While mold sometimes would grow on the finished beverage, only in the rarest instances was there any evidence of yeast fermentation. With the proper yeast culture, the flavor of the beverage was altered very little by this treatment. Much investigation was required, however, to find a yeast culture that would not impart any undesirable flavor. Many cultures of wine yeast were tried, and finally one was obtained which seemed to improve the natural flavor of the product.

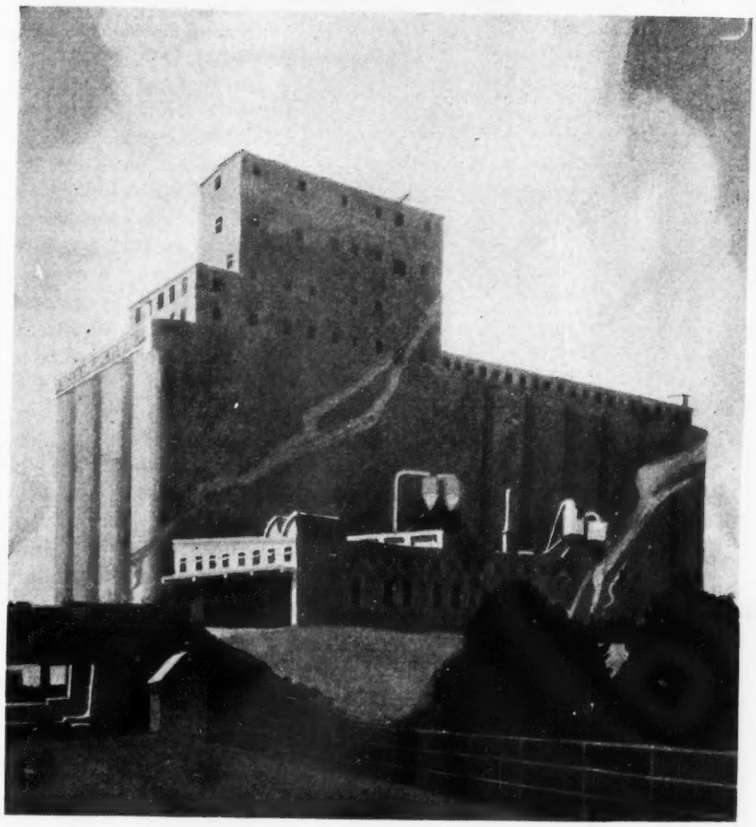
In addition to the matter of flavor, the relative ability of the yeast to develop rapidly and to immobilize a maximum amount of nitrogen had to be considered in selecting the proper variety. With many cultures of specialized yeast, the growth was slow and the removal of the nitrogen inadequate for the purposes of the process.

It is believed that the pre-fermentation process can be applied advantageously to many beverages now preserved by chemical agents, for however innocent the chemical agents may be in their effect upon the human system, the presence of their names on the label may easily create a doubt as to the wholesomeness of the product. Furthermore, the ultimate value of the process may go beyond its use in preserving products from fermentation. Among the infinite possibilities introduced by Vandecaveye's pioneer experiments are improvements in wholesomeness and production of new and distinctive flavors.

Tendency of a carbonated beverage with a natural fruit base to spoil was overcome, not by eliminating fermentation, but by directing it. Tests showed that nitrogen content was the limiting factor in fermentation. By inoculating the concentrate with a proper variety of yeast, and subsequent filtration, nitrogen content was reduced to such a point that no fermentation occurred in beverages made from this pre-fermented concentrate. For other products slightly susceptible to fermentation which cannot satisfactorily be preserved by sterilization or chemicals because of flavor changes, "pre-fermentation" also offers possibilities.

Selecting Grain for the Baker by

SCIENTIFIC GRADING



Large storage elevator for wheat

By R. C. SHERWOOD

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WHEAT offered for sale in the regular markets of the United States is graded according to the standards promulgated by the United States government under the Grain Standards Act of 1916. At country points where local elevators receive wheat directly from the farmers, as well as in the large terminal markets, wheat is tested and graded before being sold, although the examination of the samples and the issuance of certificates by licensed state and federal inspectors is not mandatory at country points, as it is in the terminal markets.

The grading of wheat did not originate with the Grain Standards Act. Prior to the passage of this act the several states where terminal markets existed established their own standards. The state of Minnesota, for example, with its large markets in Minneapolis and Duluth, has supervised the merchandising of wheat for over 45 years and enormous quantities of wheat were sold in the United States under Minnesota grades both for grinding by domestic mills and for export before the federal government began supervision of wheat grading in 1917. At the present time the Minnesota State Grain Inspection Department regulates the grading of grain within the state, operating under the supervision of the federal department, and following identically the standards of the Federal Grain Supervision.

A word about the purpose of grain standards may be pertinent at this point. Definite classification of wheat into a number of numerical grades according to its characteristics is an advantage to both buyer and seller. It provides a means for the farmer who raises the wheat to describe the particular parcel of this commodity which he offers for sale in terms which are commonly understood, and it also permits the buyer, who ultimately is the miller, to prescribe the type and the characteristics of the wheat which he wishes to grind, thus providing a basis for a price agreement. The wheat raised each year differs so materially in its milling and baking value that even the system of grades now in effect, which are frequently criticised for their complexity, are none too adequate in describing the milling, and hence the monetary, value of each carload of wheat.

Wheat grading standards include five main classes of wheat with three sub-classes and six numerical grades in each class, or sub-class, in order to accommodate the many types and kinds of our most important cereal. These five classes are: (1) hard red spring, (2) hard red winter, (3) white wheat, (4) soft red winter, (5) durum. The first three are primarily bread wheats; soft winter is used principally for biscuits, cake, and crackers; while durum is used for macaroni and not for bread.

It will not be possible in this short paper to discuss in detail standards for each grade of wheat. It is necessary to mention, however, the basis upon which wheat is classified into different grades. The five most important grading factors are weight per measured bushel; moisture content; percentage of dark, hard, vitreous kernels, presence of inseparable or contaminating foreign matter; and damage due to one or more of several causes. Weight per bushel always is operative in establishing the numerical grade, while moisture content becomes a

Part of the Minnesota State Grain Inspection protein laboratory, where all cars of wheat shipped into the Minneapolis market are tested

grading factor only when it exceeds 14 per cent in spring wheat or 13.5 per cent in winter wheat. Foreign matter and damaged kernels are grading factors when certain specified limits are exceeded. The percentage of dark, hard, vitreous kernels is a factor determining the subclass but not the numerical grade. Dockage, which includes screenings removed by testing apparatus, is not a grading factor, but it presents a problem in wheat cleaning for the miller.

Wheat grading is highly technical, as evidenced by the estimate that there are about 250 different grades possible under this system. This number does not contemplate a variation in protein content, which is not a grading factor, but which has become an extremely important price factor in most seasons.

Where does the chemist and the chemical laboratory fit into this picture?

Wheat is raised and sold primarily for the purpose of flour manufacture. Since all wheat is not of equal value for this purpose, research has been necessary to determine those characteristics of wheat which indicate superior milling properties. The chemical laboratory has figured prominently in this kind of research. The relation of weight per bushel, one of the grading factors, to flour yield has been investigated by many workers, all of whom have reported that flour yield increases with increasing weight per bushel, other things being equal.

Moisture content of wheat has been found a hazard in storage when it exceeds 14 per cent, due to increased rate of respiration, with subsequent rise in temperature and damage from heat. It is for this reason that spring wheat is degraded when the moisture content exceeds 14 per cent.

Wheat moisture bears a definite relation to total yield of products of milling. Tests at the Minnesota State Experimental Flour Mill have shown that wheat of approximately 13 per cent moisture will yield 100 per cent return. Wheat with lower moisture will yield an overrun, as the quantity of water added in conditioning the wheat for milling exceeds the loss of moisture during the milling process. Moisture is therefore a grading factor for two reasons: when moisture content is high, the buyer is informed of the hazard involved in storage due to danger of overheating; when it is low, it represents the enhanced value of the wheat for milling purposes.

The effects upon milling and baking properties of various kinds of foreign matter in wheat and the limiting quantities which may be included without impairment of baking properties have been studied by a number of investigators.

Experiments in the Minnesota State Experimental Flour Mill have shown that the cleaning loss in milling almost invariably exceeds the dockage assessed by grain inspectors. This relation varies in different seasons. The discrepancy between assessed dockage and cleaning loss varies also in different ranges of assessed dockage.

In such investigations as these the chemical laboratory has supplied valuable information regarding the relation of the various grading factors to the milling and baking properties of wheat and flour. Some of this work preceded and undoubtedly influenced the establishment of federal wheat grades, while some of the research of recent years probably will be responsible for changes in the grading standards in certain particulars. Viewed from the standpoint of research the chemical laboratory has contributed materially to grain standardization.

Grain grading as first practiced in our regulatory grain inspection departments involved physical tests almost exclusively. The determination of weight per bushel, the separation of dockage from cleaned wheat, and the estimation of the amount of foreign matter did not require chemical apparatus or trained chemists. Only the determination of moisture savored of a chemical determination. Moisture content has not always been determined in every car of wheat sold until recent years. There has become a greater demand for this test from wheat buyers, and at present all cars of wheat sold in the Minneapolis market are tested for moisture content.

The Brown-Duvel determination, which is a direct method involving the heating of wheat in oil under specified conditions, is the official method for grain testing. This method has the advantages of being rapid and permitting the use of whole wheat, but it is less accurate than oven-drying. Compared with the official vacuum oven method, the Brown-Duvel method gives

results approximately 0.65 per cent lower. Because of the greater variability of the Brown-Duvel method, especially in the hands of different operators, and its lack of agreement with the official method for cereals, the oven method, which requires heating for one hour at 130 deg. C., is quite generally used in cereal laboratories.

Kernel texture is the basis of grading into sub-classes. The Federal Grain Standards Act specifies dark Northern spring, Northern spring, and red spring as sub-classes under the hard spring wheat class. Wheat is assigned to one of these classes on the basis of the percentage of dark, hard, vitreous kernels. An additional grade, called No. 1 hard spring, was added in 1924. This designation of the percentage of dark kernels is an attempt to classify wheat according to its milling value.

Investigators who have studied this problem are not in entire agreement concerning the reliability of kernel texture as an index to wheat quality. Shollenberger and Coleman[1] have shown that within a given sample of wheat the kernels of dark vitreous texture normally are superior to the starchy kernels in baking value and in protein content. Although this is true in the case of an individual sample, there are such wide variations in baking value of different samples, classified the same on the basis of kernel texture, that in practical application to commercial wheat the designations "Northern" and "dark Northern" do not suffice as quality factors. Mangels[2] found a significant positive correlation between protein content and percentage of dark, hard kernels in 1922 and 1924, but only a slight positive correlation in 1923. Results of tests in the Minnesota State Experimental Flour Mill have shown that in some seasons cars of wheat grading Northern spring contained as much protein as cars of wheat grading dark Northern spring, and also that cars of Northern spring wheat frequently exceeded in baking value the average dark Northern spring wheat. The wide range of protein content within the different sub-classes of spring wheat is further evidence that the designations "Northern" and "dark Northern" are inadequate as an index to the milling value of wheat.

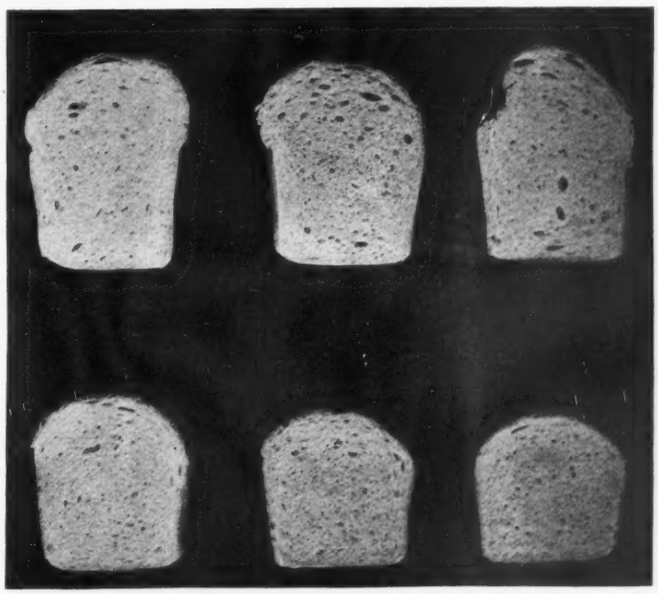
The determination of protein content of wheat, therefore, has become of great importance in the merchandising of this commodity. Research has shown that the quantity of protein in wheat is directly related to that in flour and, further, that the protein content of flour is correlated positively with the loaf volume of bread baked from the flour. Millers have known for years that determinations of protein content were useful in evaluating wheat. It was not until some ten years ago, however, that this determination became an important factor in the merchandising of wheat. Commission firms offering wheat for sale gradually recognized that millers were utilizing protein determinations in their laboratories, and consequently found it advantageous to label wheat for sale with the protein content. At first the demand for these tests was met by commercial laboratories. Later, the state inspection departments installed laboratories and put an official protein test upon the wheat at the time it was graded. The state of Kansas was the first to establish such a laboratory. Three laboratories were put in operation in 1923. Later, the state of Missouri installed a protein laboratory in the Kansas City market, and in 1926 Minnesota equipped protein laboratories in both Minneapolis and Duluth. Since the installation of the state laboratories in Minnesota, every car of wheat shipped into the Minneapolis and Duluth markets has been tested for protein content as well as for grade under the federal grain standards.

Sampling a stream of wheat delivered from a terminal elevator to a steamer for transportation down the Great Lakes

Protein content is not a grading factor. The result of the determination is added to the grading certificate as a notation, but since protein content is not required by the federal grades this notation is not a part of the official grade. In addition to the state laboratories there are a number of commercial laboratories operating primarily for the purpose of testing wheat for protein content. In some seasons when the average protein content of the wheat crop is low, wheat of high protein content is scarce and much in demand. This results in substantial premiums being paid on account of high protein content. It has not been uncommon for buyers to pay premiums on the basis of 1 cent per bushel for each 0.1 per cent of protein in the range of 12 to 16 per cent. Exceptional cars have sold for 60 to 65 cents per bushel above the prevailing option price. In seasons when the average protein content is high, however, premiums may, on this account, fall to a very few cents per bushel.

The demands of the grain trade for accuracy of tests require considerable checking by both buyers and sellers. Chemical laboratories have kept pace quite well with the demands of the trade, and

Typical loaves of bread made from high-protein (above) and low-protein (below) spring wheat flours, with the same quantity of flour used in each of these experimental baking tests



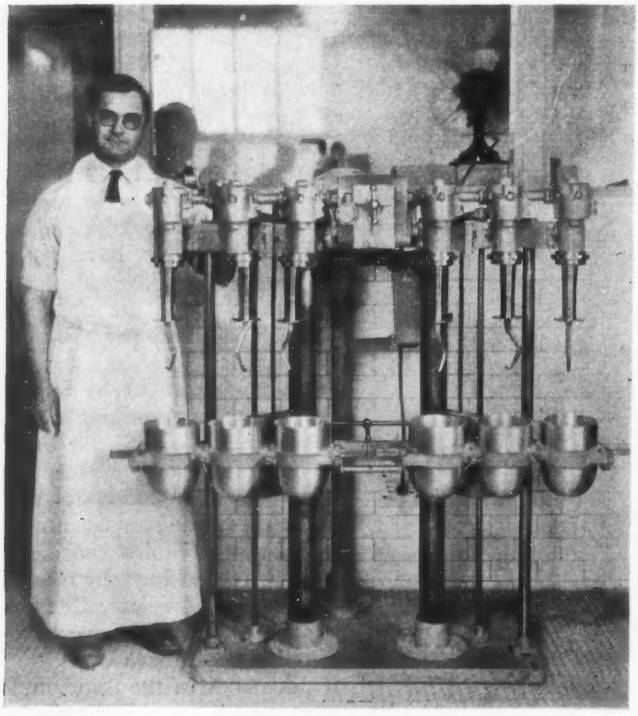
methods have been speeded up and refined until there is a high character of work done in most of the laboratories.

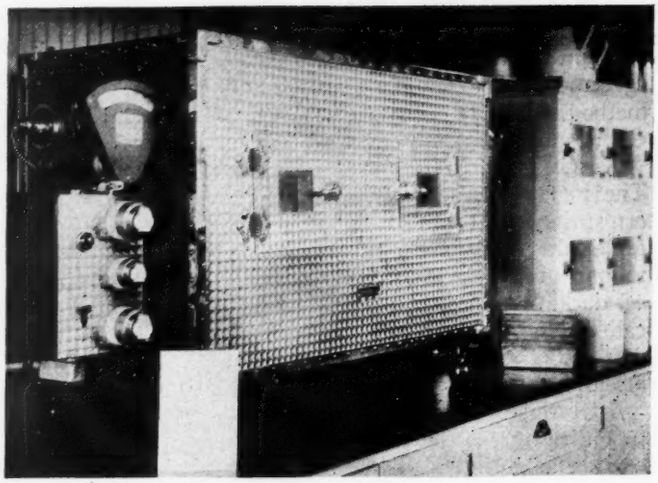
Many outside the cereal industries may not realize the enormous volume of protein determinations made in a market like Minneapolis. The Minnesota State Protein Laboratory, with 100 units for digestion and an equal number for distillation, has completed 1,500 determinations in a 24-hour day. More than 30,000 protein tests have been made in a month in the busy season. It has been estimated that in the various laboratories in Minneapolis on a busy day the total number of protein determinations made is no less than 5,000. Properly equipped laboratories can turn out 100 to 125 determinations per man per eight-hour day. This work is seasonal, however, depending upon the market receipts of wheat. Furthermore, in crop seasons when there is an abundance of high protein wheat there is a greatly reduced demand for protein testing by the grain trade.

These figures are quoted to emphasize the important part the chemical laboratory plays in wheat merchandising. Wheat is now purchased from the farmer on a protein basis as well as official grade, if he so desires. To facilitate testing closer to the wheat producing areas, Montana maintains six protein laboratories at strategic points in the state, besides three commercial laboratories.

The determination of crude protein is the best single available index to baking properties of wheat flour. There is a positive correlation between protein content and loaf volume, which is used as a measure of flour strength. Bailey and Sherwood[3] reported a coefficient of $+ 0.27 \pm 0.04$ in a study of commercial hard spring wheat flour of three crop years. Mangels[2] reported correlation coefficients varying from $+ 0.30$ to $+ 0.42 \pm 0.04$ for experimentally milled wheat of several crops. Furthermore, the determination of protein is an operation which can be performed rapidly and accurately enough for the grain trade. In these respects it has displaced the determination of washed crude gluten, which had long been used in cereal laboratories.

Dough mixing machine for experimental baking tests in which six doughs can be mixed at once, at either high or low speed, thus insuring uniformity in mixing, an important factor in testing wheat flour





This experimental bake oven and the adjacent fermentation cabinet are equipped with automatic control

In certain respects the protein determination differs from chemical tests used to evaluate other kinds of raw materials used in industries. The Babcock test for butter fat measures the percentage of pure fat which may be removed from milk. An assay of gold ore shows how much gold can be extracted. Wheat testing is different. Crude protein is not extracted. It is valuable for its potentialities, its capacity for producing a large, shapely loaf of bread. Therefore, the percentage of protein in wheat is both a quantity and quality factor. Other tests have been found valuable for evaluating wheat and flour, but none has thus far been adapted to the demands of wheat grading and merchandising, because they do not lend themselves to quantity production. The baking test is the final and most important test of flour, but the rapid movement of wheat through the markets prohibits milling and baking tests of samples from each carload of wheat. Determination of diastatic activity, which frequently is a limiting factor in producing bread of large volume, determination of soluble nitrogen as an index to damage from frost or sprouting, and many other tests are valuable, but they can not be made with the speed necessary.

It must not be inferred from this discussion that only high protein wheat is sought by millers. High protein content is desirable for bread flours only. Low protein, soft winter wheat is preferable for cake and cracker manufacture; therefore the soft wheat miller evaluates wheat in large measure by its lack of protein.

While the protein determination has aided immensely in marketing bread wheats, it is not as useful for durum wheat. Here color is an extremely important factor and there is work for the chemist in devising methods for evaluating durum wheats that are applicable to grain merchandising.

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California Progresses in

PRESERVING CITRUS JUICE

A survey of current practice in extracting and processing, by heat or refrigeration, the juice of oranges, lemons, and grapefruit

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THE production and preservation of citrus fruit juices is not the simple, "get-rich-quick" proposition it appears to be. Permanent preservation in the natural state is very difficult, because of the complex changes occurring in the juices directly after their removal from the fruit. These changes have been found to be of at least three kinds: (a) those due to living organisms, easily prevented by pasteurization; (b) those due to enzymes, not yet fully understood but partially controlled by pasteurization; (c) those due to oxidation and chemical reactions between the normal constituents of the juice. We know that the last group are accelerated by heat, concentration, and metallic contamination, and proceed with the formation of dark pigments.

Packing-house culls are generally used as the raw material for these juices. "Commission merchant culls," a still lower grade of fruit that is left after packing house culls have been sorted by peddlers or commission merchants, are also sometimes used after the considerable quantity of decayed fruit, "black hearts," and smutty fruit which they contain is sorted out. "Grove run" fruit is sometimes used by large manufacturers in order to insure an adequate supply. Naturally, the juice is best when prepared from ripe, sound fruit.

Juice of Valencia oranges has more flavor and a more desirable sugar-to-acid ratio than that of Navels. Juice extracted from Navel oranges turns bitter about twice as rapidly as that from the Valencias, and is of poorer keeping quality. The oil cells of the Navel are more easily broken than those of the Valencia and more of the peel is extracted with the juice.

In the majority of plants using packing house culls, the fruit is sorted after washing. The fruit may be dumped from the 50-lb. field lug boxes, in which it is received from the packing house, into a tank of water fitted with a chain conveyor system which is fed by hand, and the moldy, rotten, and split oranges removed. The fruit is then conveyed to fruit washers equipped with revolving brushes, where it is thoroughly washed and then conveyed by elevator to the juice extractor on the floor above.

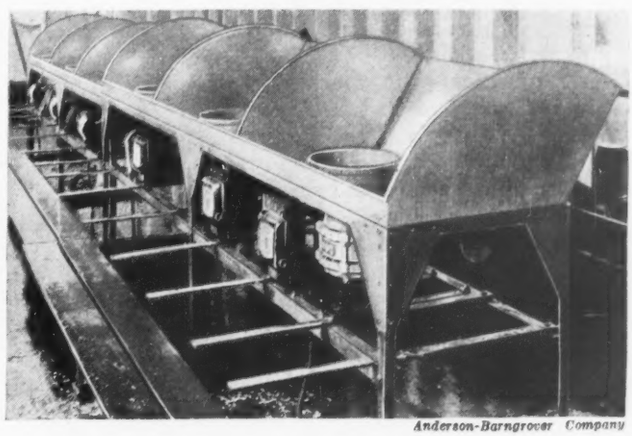
In a more recent installation the packing-house culls are unloaded outside the plant into a tank of water from which they are conveyed down a flume by means of a slat conveyor. A current of water created by a pump takes them up an incline to fruit dryers where excess water is blown off. The fruit then travels along a horizontal belt, where sorting may be done, and is finally elevated to the floor above.

When an especially poor lot of fruit is used, it is advisable to sort before washing, in order not to foul the washer with rotten fruit, dirt, and mold spores. In general, the fruit is fairly uniform in size and does not have to be graded before extracting the juice. If there is a large variation in the sizes, extraction by burring can be facilitated if the fruit is graded into small, medium, and large fruit before being cut.

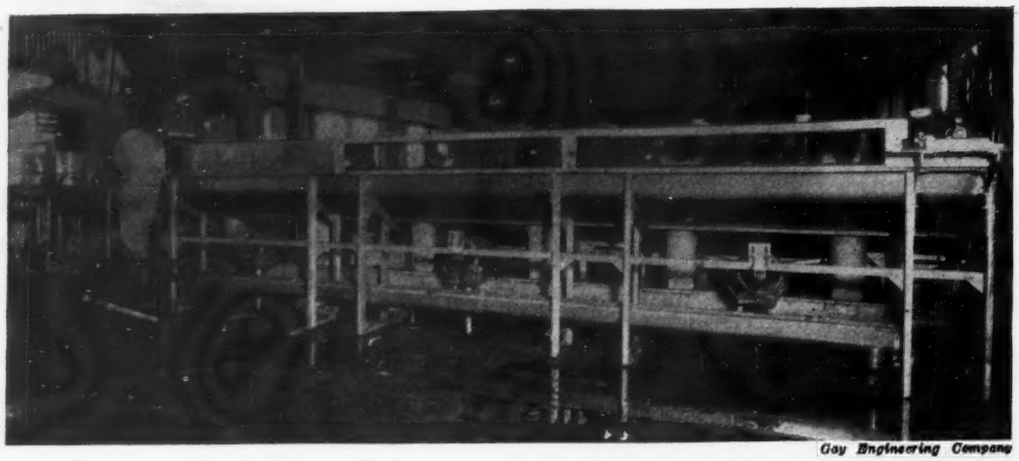
To avoid inclusion of the strong oil and bitter flavor of the peel, the juice generally is extracted with a revolving cone extractor. First the fruit is fed automatically by gravity flow down a V-shaped chute, constructed either of heavily paraffined, hard-grained maple wood or of Monel metal, to a stainless steel slicer. The halved fruit drops on rubber belts moving in front of the burring units. In the most recent installation the halved-fruit conveyors are constructed so that the unused halves can be recirculated before the burrers. In order to facilitate burring it is desirable to cut the fruit in half perpendicular to the axis of growth between the blossom and stem ends. When the fruit is fed to the slicer down the V-shaped chute, about 75 per cent of the oranges are cut in the desired manner. In cutting lemons, about 95 per cent are properly cut, but the relative shortness of the growing axis of grapefruit makes it difficult to achieve a cross-axis cut in this way.

A direct-connected, inclosed, motor-driven, conical ex-

The six burring machines for extracting citrus juices have unit drives



Anderson-Barngrover Company



Gay Engineering Company

Rear view of the extracting units at plant of Goldenhealth Fruit Products, Ltd., Long Beach, Calif.

tractor unit is preferable to a shaft-driven one, as there is less vibration and the unit is more flexible. Cast aluminum and Monel metal burrs are used. Burrs with helical rather than vertical ribs are preferred, as they aid in gouging out the pulp and are easier on the operator's hands.

The extracted juice is generally screened to remove large pieces of pulp and seeds and is then often passed through a brush finisher (e.g., a Kern brush finisher for corn, or a tomato finisher), where the remaining fibers are finally broken and thoroughly mixed with the juice. The use of a finisher is undesirable, however, as it beats air into the juice and thus causes complications in the subsequent treatment. In the latest installations, an inclined, rotating, cylindrical screen has successfully replaced the finisher and screen. By this means the coarse pulp and seeds are rapidly and thoroughly removed without the excessive admixture of air into the juice.

The yield of juice will depend on the variety and the condition of the fruit. Ripe, sound oranges will yield 90-100 gal. of juice per ton of fruit; lemons, 60-70 gal.; and grapefruit, slightly more. The coarse pulp and seeds screened from the juice form 6 to 8 per cent of the weight of the oranges and the peel about 50 per cent. In lemons, the peel forms 40-50 per cent of the weight, but there is a relatively greater percentage of insoluble solids in the juice which is screened out. The ratio of weight of peel to weight of fruit depends to a large extent upon the length of time the fruit is off the tree.

The juice generally is extracted by women, who become expert and efficient in the work. Their hands must first become toughened and more or less inured to the action of the juice. The average worker will extract about 8 gal. of juice per hour, 16 gal. being the maximum that can be extracted per hour under usual operating conditions. As high as 25 gal. per hour has been extracted by expert workers.

All equipment with which the juice comes in contact should be made of resistant alloys, as certain metals in solution catalyze a change in flavor. Where wooden structures are used these should preferably be of maple and heavily paraffined. All parts of the equipment should be accessible and should be frequently and thoroughly cleaned and washed. Since the acid fruit reacts with concrete, uncovered cement floors should not be used near the extracting units. Trinidad mastic asphalt forms the most suitable floor covering. This can be applied on top of wooden or cement floors.

The peel from the extracted fruit can be dumped into lug boxes which are periodically removed and emptied, or it can be removed on a belt conveyor and conveyed to a large hopper, from which it is loaded into trucks when the peel is to be sold. It is the custom now to sell the peel to pectin and oil manufacturers, as the demand for candied peel formerly made by juice manufacturers is too small.

As the flavor of orange juice changes very rapidly, it is practically impossible under commercial conditions to extract the juice without some appreciable change taking place. Lemon juice deteriorates in flavor even more rapidly, but grapefruit juice is somewhat more stable. The extracted juice must be treated as rapidly as possible with the minimum exposure to air. Continuous treatment of the juice in an inclosed system is preferable to intermittent treatment, and especially to those in which open units are used.

Unsweetened orange or lemon juices cannot be successfully preserved by heat treatment, and are generally transformed to sweetened juices or syrups by the addition of sugar, essential oil, and acid, or are immediately concentrated in glass-lined vacuum pans.

A fairly satisfactory sweetened juice for the preparation of beverages can be prepared by mixing one part of lemon juice and three parts of orange juice and adding about 4 lb. of sugar to a gallon of this mixture, which is flavored with an emulsion of orange oil. Sweetened juice can be preserved by heating to 180 deg. F. in water-heated coils, filling hot in specially enameled cans, sealing, and immediately cooling.

Sweetened grapefruit juice preserved in a similar manner is more satisfactory than the orange or lemon juice.

Grapefruit juice has been preserved by canning in plain tin cans or in enameled cans. In the more commonly used process, the extracted juice is led into glass-lined refrigerated tanks, where it is blended to the desirable acid-sugar ratio, and then filled into tin cans which are exhausted at about 160 deg. F. for about 10 min., sealed and processed for 10-20 min. at 160 deg. F. Fully ripe grapefruit should be used and the juice should be extracted so as to incorporate the minimum of naringin, the bitter glucoside present in the rag and peel of grapefruit. The flash pasteurization method developed for the sweetened juice would appear to be a better method of canning grapefruit juice.

For the preparation of carbonated citrus beverages, one part of lemon juice is mixed with three parts of orange juice; 7 lb. of sugar is added per gallon of mixture. This is flavored with added cold-pressed orange oil emulsion and contains added pectin to aid in keeping the fibers in suspension. The mixture is then flash pas-

teurized at about 180 deg. F. and stored in clean paraffined barrels. One-tenth of 1 per cent sodium benzoate is generally added. Carbonated beverages prepared by adding 9 oz. carbonated water to 3 oz. of the syrup and pasteurized at 165 deg. F. can be preserved for about a year. The product will often keep without pasteurization and apparently is often more satisfactory than the pasteurized carbonated juice.

Citrus juice concentrates are generally prepared by concentrating the juice in glass-lined vacuum evaporating pans to 70-72 deg. Brix. Orange concentrate has proved the most popular. They are generally heavily flavored with essential oils and artificially colored. Concentrates prepared by freezing are of better quality, but the cost of manufacture under present conditions is prohibitive. Concentrated juices are not prepared by independent operators to any great extent, because they cannot compete with flash pasteurized syrups either in price or quality.

Freezing is the most successful method of preserving citrus juices—at least, of those methods which can be used commercially. Although it has only recently been introduced in California, it is safe to say that most of the juice extracted is now stored in the frozen form. Under some conditions the frozen juice can be stored indefinitely at 0 deg. F., but under others the juice turns bitter and suffers marked deterioration in flavor, after about two months' storage at this temperature. Apparently the changes observed in freezing storage are due to oxidizing enzymes whose activity is not inhibited at temperatures as low as 0 deg. Juice extracted with a minimum exposure, in the absence of air, promptly chilled or precooled, and frozen in the absence of air in tightly sealed containers, retains its flavor much longer than similar juice frozen in the presence of air or containing much air incorporated into it during extraction. That air oxidation is the chief and only cause of deterioration has not been shown, although it does play an important part.

Two methods of quickly chilling the juice are used commercially. The first method makes use of a vertical, direct-expansion, ice cream freezer with its inner beating paddles removed, leaving only the outer scraping paddles. Directly after screening, the juice is passed into the freezer, where it is frozen to a slushy consistency and precooled to a temperature of 28-30 deg. F. It is then packed into 30-lb. enameled tin cans with a slip-over top and frozen hard at 0 deg., after which it is stored at 15-20 deg. Although the juice is very rapidly precooled, the process is an intermittent one and it is impossible to avoid beating some air into the product. When sound, ripe fruit is used, however, the juice keeps fairly well in storage.

In the most recent installations, the precooling of the juice is accomplished continuously in a closed system. The extracted juice is passed continuously by gravity through the coils of a Baudelot cooler refrigerated by sprays and streams of cold brine. The precooled juice is discharged into enameled cans and frozen at 0 deg. F. It is desirable to fill from the bottom to avoid foaming: i.e., the feed pipe should extend to the bottom of the can. In coolers like the Baudelot, it is important to regulate the temperature so that the juice can be precooled to slightly above its freezing point, as the formation of "slush" in the more or less horizontal pipes of the cooler would retard the flow of juice and decrease the rate of cooling.

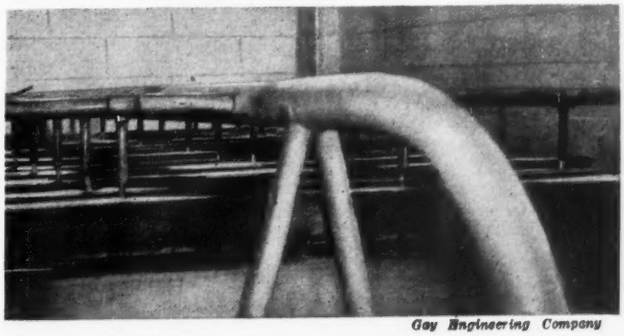
Gay Engineering Company.

A corner of the storage room in which 30-lb. cans of frozen juice are stored at 15-20 deg. F.

Of course, the frozen juice must be distributed under refrigeration, and used shortly after thawing. To reduce the change in flavor during thawing to a minimum, the frozen juice should not be completely thawed out when it is repacked for retail distribution. The juice can be partially thawed out until it slips readily out of the can, and then reduced to slush in an ice shaver or crusher.

Recently a cylindrical or drum freezer has been developed by the Gay Engineering Company, of Los Angeles, and also by the General Foods Company. The juice is frozen in flakes in freezers of this form and then compressed into cakes of suitable size and frozen directly in brick form in another type of freezer. The bricks of juice are then wrapped in an air-tight and liquid-tight container for distribution to the consumer.

Brine distribution head of Baudelot cooler. Brine flowing over the pipes cools the citrus juice within them to just above freezing



Gay Engineering Company

The Consent Decree

AFTER MODIFICATION—WHAT?

By O. FRED ROST
Director, Survey of Distribution
McGraw-Hill Publishing Company

DRASTIC changes are predicted in every branch of the food industry as the direct result of the modification of the famous Packers' Consent Decree, pronounced on Jan. 5, 1931, by Justice Bailey, of the Supreme Court of the District of Columbia.

While at this writing there is still a possibility that an appeal will be taken by the government from Justice Bailey's decision, the probabilities for this happening are considered slight. In some quarters it is felt that the government has done its best to prevent modification and will let the matter rest where it is; others believe that as a matter of principle the Department of Justice must carry the case to the U. S. Supreme Court. In that event the packers probably would refrain from taking any important steps permitted under the modification status but which would have to be retracted if the U. S. Supreme Court reversed the decision.

As far as the packers are concerned, no attempt to appeal Justice Bailey's decision is expected, because under the modified decree they are substantially free to do most of the important things. That they are still restrained from engaging in the retail business appears of comparatively little importance, since, on the other hand, they are free to take the fullest advantage of already existing retail outlets.

The packers in their testimony during the recent trial attempted to establish the fact that changes in general conditions, and particularly in the field of food production and distribution, justified their demand for modification.

The evidence offered in support of this contention presented some rather interesting angles. For instance, while the original decree more or less was the result of agitation by farmers and livestock raisers, who declared they could not get satisfactory prices for their products, in the recent hearing representatives or petitions from 27 farm organizations were presented—all in favor of modification of the decree, including even all members of the Federal Farm Board.

One of the packers' strong arguments in favor of modification was based on the tremendous development of chain store selling. Referring to the Kroger Grocery & Baking Company, they asserted that "such concern is entrenched in a position where within the next few years it may very easily eliminate a great number of competitor retail meat markets which are the customers of these defendants, and at the same time be in a position to capitalize their large purchasing power and dictate as to the prices which they will pay for the defendants' products." [The meat business of Kroger Grocery & Baking Company increased from six million dollars in 1920 to forty million dollars in 1929.]

Similarly, evidence was presented to the effect that the Great Atlantic & Pacific Tea Company is installing meat departments in many of its 15,000 grocery stores and had 3,851 such meat departments in 1929.

However, John A. Hartford, president of that great chain store organization, also testified that a majority of its meat was purchased from one or the other of the large packers. This indicates that there exists at least a very friendly spirit of co-operation between the world's biggest food chain and the large packing interests.

As further evidence of the changes that have taken place in the distribution of meat, it was shown that Nathan Straus, operating a chain of retail meat shops, had but 50 stores in 1920, but in 1929 operated 220 stores, with volume four times what it was in 1920.

IN EVERY detail the packers had their case excellently prepared and seemingly had done everything possible to support their plea with weighty evidence. On the other hand, the government was ready with a strong defense against modification and received effective and valuable assistance from the two interveners recognized by the court: the American Wholesale Grocers' Association and the National Wholesale Grocers' Association.

Some of the evidence produced in opposition to modification is of more than passing interest. For instance, salesmen testified that business was solicited from railroads on the reciprocity basis in exchange for routing shipments over their lines.

Figures presented indicated that the four large packers are now doing over four billion dollars business annually and if the plea for modification were granted they probably would increase that by two billion more, so that then they would be doing practically 25 per cent of the nation's food business.

Numerous independent wholesalers and retailers testified that to grant the packers their demands would mean that they probably would be driven out of business.

The government in contending that ten years' operation of the decree had not dispersed the possibility of the food monopoly by the packers, cited six specific reasons: (1) That people buy where they can buy cheapest; (2) that conditions under which the packers would be operating would enable them to sell more cheaply than their competitors; (3) that the packers' ability to sell more cheaply grew out of their size and their control of various lines are necessary functions; (4) the packers' willingness to employ conclusive and coercive tactics in competition and to use their large control in certain lines to promote their interests in others; (5) that the packers, through practically exclusive patent control of quick-freezing processes, might obtain further advantages over their competitors; (6) the packers' position of dominance and the importance of their operations.

Substantially, evidence presented at the hearing constituted a rather complete review of the changes that have taken place in food distribution during the last decade.

In his decision Justice Bailey modified the original decree and permits the packers "to manufacture, sell, and deal in" the commodities referred to as "unrelated lines" and "to use or permit others to use" their distribution facilities.

In pronouncing the need for preserving and stimulating competition in the retail field Justice Bailey states that "to permit the defendants to engage in the retailing of their own products would have the opposite result." However, previously in the same paragraph the Justice also says that "whether such complete integration of merchandising from producer to consumer would produce better conditions as a whole is an economic question which is not for the court to decide."

One important result of the present proceedings that constitutes a distinct victory for the packers and in itself justifies the recent proceedings, at least in so far as the packers are concerned, is that it practically has wiped out all possible chance of the government ever proceeding against the packers for anything that they may have done prior to acceptance of the original consent decree and up to the date of Justice Bailey's decision.

By stipulation of counsel the government has acknowledged: (1) That active competition prevails in the meat packing business; (2) that active competition exists in the retailing of food products. Furthermore, Justice Bailey in his decision states that "it is conceded that there is today no monopoly in the meat packing industry."

IT IS, of course, too soon to tell how far the packers will go in capitalizing their new freedom. The impression is abroad that much of the ground work for expanding activities permitted under the modified decree has been laid in anticipation of the modification becoming an accomplished fact.

The decision does not give the packers the right to engage in retailing, but, on the other hand, there is no limitation put upon the nature of any arrangements they might make to obtain retail distribution. In the final analysis, the effect of the modification upon the food manufacturing industry and the food wholesalers depends to a great extent on just what method the packers decide upon to insure retail distribution.

It is unlikely that independent grocers and meat stores alone could, or would, absorb the ordinary flow of "unrelated" products that the packers would have to expect to maintain in order to effect the obtainable economies in distribution through use of existing facilities.

Voluntary chains are generally organized on the principle that independence is guaranteed to each individual operator. Therefore, the members constituting such voluntary chains are likely to look with suspicion upon any proposal for closer affiliation with the packing interests.

IT THEREFORE appears that the packers' only other opportunity for obtaining immediate retail distribution of "unrelated" products through already existing retail outlets lies in affiliation with chain store systems. There are at present over 800 food chains in existence, credited with doing 35 per cent of the country's retail food business. Probably only the larger chains can provide for the packers the type of retail distribution they require.

The Great Atlantic & Pacific Tea Company, according to testimony presented at the hearing, is now buying 90 per cent of its meats from the four big packers. On the other hand, this company already owns or controls the producing and manufacturing facilities for many of the so-called "unrelated" products. It also owns a highly efficient system of motor truck transportation with its greatest concentration in approximately the same territories where the four big packers maintain complete warehousing and trucking facilities. It is therefore apparent that any arrangement in the direction of closer co-operation between the large meat packers and the world's largest food chain would require rather specific and very definite re-alignment if it were to develop any substantial benefits for both parties.

The Kroger Grocery & Baking Company, second largest chain grocery system in the United States, with 5,165 retail food stores, is now operating on a basis where closer co-operation between them and the packers undoubtedly would prove mutually beneficial. This company packs only about 25 per cent of the meat it now sells and produces or manufactures comparatively few of the products that the packers probably could supply economically. Its sales volume for 1930 ran well over one-fourth billion dollars, and this company therefore is in position to provide an important retail outlet.

Many other smaller chains are operating in comparatively small and specific territories and undoubtedly provide an opportunity for the packers to obtain retail distribution in territories where existing warehouses and distribution machinery make concentration desirable.

Ewing Galloway Photo

WHAT IS WRONG WITH LARD SALES?

By SLEETER BULL
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THE livestock and meat industry is considerably depressed by the low price of lard. This important byproduct of the hog now sells at wholesale at considerably below the cost of the dressed pork carcass. This means that the remainder of the carcass must sell for enough to make up the loss on the lard and to provide a profit on the entire carcass. The apparent solution to the problem is to slaughter lean hogs instead of fat hogs. However, the solution is not so simple, because the housewife demands pork chops and hams that are tender and juicy. Such meat comes only from a young, fat hog. She also demands breakfast bacon "with a streak of lean and a streak of fat." Unfortunately, the hog lays 10-cent lard upon his back at the same time he streaks the lean of his belly to make 30-cent bacon.

No more fat is wanted than is absolutely necessary to produce meat of the desired quality, and many producers are now supplying hogs with the minimum quantity of fat essential for high-grade meat. As a matter of fact, the fatter the animal, the more expensive is the cost of production, so the producer is glad to market a leaner hog.

The lard problem still persists, even in a hog carrying the minimum amount of fat, since as much as 18 per cent of such a carcass may go into the lard pail.

The question naturally arises as to why lard is so cheap. The lard situation is peculiar. Lard is relatively much cheaper than it was twenty years ago, yet statistics show that the per capita consumption of lard in this country is practically the same as then, while exports of lard have actually increased. The increase in exports is explained by the fact that the European is a bargain hunter and buys larger quantities of lard when it is cheap. Our lard has been on the bargain counter and the European buyer has taken advantage of the low price.

The low price of lard undoubtedly is due to the large increase in the use of vegetable shortening. The housewife has a choice between fats of animal and of vegetable origin. She may use a nut margarine for the daily bread. She may use lard or a vegetable fat for shortening, frying, and other cooking purposes.

Vegetable fats are cheaper to produce than animal fats. Obviously, it is more expensive to produce a pound of butter fat in Wisconsin than a pound of coconut oil in the South Sea Islands. It costs more to produce a pound of lard in Iowa than a pound of cottonseed oil in Georgia. Consequently, one would expect butter and lard to sell higher than oleo and vegetable shortening. Butter does sell materially higher than oleo, but vegetable shortening sells higher than lard. It will throw some light upon the problem to study the reasons for this paradox. From the nutritive standpoint, there is but little difference between butter and oleo. Butter made in the summer time contains a large quantity of vitamin A which is not present in oleo. On the other hand, irradiated oleo contains vitamin D, which is not present in large quantities in butter. In energy value, butter and oleo are on a par.

The big advantage which good butter has over oleo is its palatability. Furthermore, the quality of butter has been increased by better methods of manufacture, storage, and distribution. Also the dairy industry has kept the merits of butter before the public by judicious and skillful advertising.

In the case of lard a different situation exists. In many of our kitchens lard has been replaced largely or entirely by vegetable shortenings which sell at a higher price than lard. In nutritive value, there is but little difference between lard and the vegetable fats. If anything, lard is somewhat better, due to the fact that its lower melting fats are more digestible than the high melting fats of hydrogenated vegetable oils. In shortening effect, experiments by the National Biscuit Company, the American Institute of Bakers, the University of Kansas, the University of Illinois, and others have revealed that lard is superior to its competitors. The plastic range—i.e., the physical constituency which makes shortening workable at different temperatures—is much wider in lard than in its competitors. Hydrogenated shortening at refrigerator or winter temperatures is hard, brittle, and will not work into the dough unless it is warmed. Another point in favor of good lard is superior flavor.

SINCE lard has distinct advantages over its competitors, it is only natural that we should seek an explanation as to why it undersells its inferior competitors. There are two outstanding reasons: First, the lack of advertising; second, the quality of lard is often poor.

As I write this, I have before me the current issues of two of the most widely circulated and influential women's magazines, *The Ladies' Home Journal* and *McCall's*. The former has three full pages of advertisements for vegetable shortening and none for lard. The latter has three pages of advertisements for vegetable shortening and one page for a lard advertisement. Cod liver oil and yeast are advertised much more than lard. I wonder what effect Rudy Vallee would have upon the lard business? Perhaps an advertising campaign to popularize lard would be too expensive for the packers to finance. If so, it should be made at the expense of the entire livestock and meat industry.

The fact remains that many housewives do not like lard. They complain about the color, flavor, softness, or grain and then pay more money for vegetable compound. There is no doubt in my mind but that the packers can improve the quality of their lard materially. Several packers are now putting out special brands of lard which, to my notion, are vastly superior to our ordinary lard and vegetable shortenings. Unfortunately, these high-grade lards are not widely advertised. A high-grade lard costs more, but the person who can afford a vegetable shortening can afford a high-grade shortening made from pork fat. As long as the lard manufacturer retains his inferiority complex, the producer receives less for his hogs and the consumer pays more for his pork than they would if lard paid its own way.

Storing Canned Fruits at High Temperatures Injures Quality*

A Discussion of the Shortcomings of Cooling Equipment for Fruit Canners

By E. F. KOHMAN

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AMONG the most effective measures to combat loss due to perforations, "hydrogen springers," and "hydrogen swells" is control of storage temperature of fruit from the time it is canned until it reaches the consumer.

Canners are inclined to consider the action of the fruit on the can in terms of "swell claims." "Swell claims" are only a minor loss, as compared with the deterioration in quality. I believe that if colored fruits packed in enameled cans could retain for a period of fourteen months the quality which they have the day after canning, the sale of those canned fruits could be doubled.

The colors in fruits, yielding a colored syrup, are known as anthocyan pigments or anthocyanins. These pigments consist of a color base, called anthocyanidin, in combination with one or more molecules of sugar of some kind. Most commonly, this sugar is dextrose. These anthocyan pigments are very soluble in water, but, as is the case with many complex organic combinations, the sugar and color base are easily split apart by hydrolysis. This tearing apart of the color base from the sugar is favored by an acid medium, a condition which prevails in most fruits. When the sugar is broken from the color base, the color base is thrown out of solution as a brown amorphous mass which no longer retains any of the original color. The brown amorphous precipitate causes some darkening of the fruit, but more serious is the gradual loss of the original bright color. This hydrolysis of the anthocyan pigments is a chemical reaction which probably adheres quite closely to the rule of having its rate doubled with every 18 deg. F. rise in temperature. Since corrosion as well as this phenomenon is similarly affected by storage temperature, there is a double reason for the canner to exert his utmost in maintaining the lowest possible storage temperature from the time of canning until the fruit is consumed.

CHANGES that have occurred in methods of distribution cause canned fruits to remain longer in the control of the canner than they once did. This affords the canner opportunity to employ the principle of low storage temperature to a greater extent that was formerly possible. The temperature at which canned fruits are held during storage is, to a considerable extent, dependent upon the temperature to which they are cooled before they are stacked in the canner's warehouse.

I have seen No. 2 red raspberries cased in fiber cases at a temperature of 110 deg. F. and stacked in a block in a warehouse. These were cased coming directly from the cooler. I have seen No. 1 loganberries trayed from the cooler and stacked the next day in the warehouse when they still had a temperature of over 100 deg. F. in the center of the tray. These are extreme instances where advantage was not taken even if the prevailing climatic conditions to get the temperature down to atmospheric level, and they cannot help but result in very rapid deterioration in quality. Many warehouses are so constructed that the prevailing temperature of the region cannot be utilized. I have seen warehouses in which the temperature gets as high as 115 deg. F. during the day. Such warehouses naturally tend to defeat anything that is done in the way of thorough original cooling. If such a warehouse is used, thorough original cooling is all the more important.

Unless fruits are cooled to the prevailing temperature of the night air, storing in cases is detrimental, because it holds the heat in. Suppose the degree of cooling were to a temperature below the average temperature of the region; then storing in cases would be advantageous, as it would keep the heat out.

THERE probably is no canner without a water supply the temperature of which is lower than that of the prevailing night temperature. Why not employ the temperature of this water supply in a more thorough cooling of canned fruits? Whatever the original temperature of the inflowing cooling water, this should not be mixed at once with the water already in the cooler. The result of thus mixing the inflowing water with the water already in the cooler is that the temperature in the end of the cooler where the cans emerge and where the cooling water enters is only approximately 10 deg. F. lower than the outflowing water at the other end, and this usually is over 100 deg. F. Under these conditions, thorough cooling is impossible.

The ideal cooler, from the standpoint of efficient use of the cooling water, would be one in which the cans pass single file through a trough, in the far end of which the cooling water enters. Unless this principle is embodied in a cooler, however, inefficient use is made of the cooling water and the canned fruit is inadequately cooled. A little mechanical ingenuity no doubt would adapt more coolers to this principle. If the inflowing water is 60 deg. F. and the outflowing water is 110 deg. F., only half as much heat is carried away as if the outflow were at 160 deg. F. Water at 160 deg. F. has not lost all its value in cooling, as it still takes heat from the cans as they emerge from the cooker half as fast as does water at 110 deg. F. If the cooler were so constructed that the incoming water could not mix with the water already in the cooler, but were made to flow counter to the cans, the same quantity of water now being used could be made to cool canned fruits to within a very few degrees of the inflowing water. With such a system, the cans could be passed through a second cooler, in which the water is subjected to artificial refrigeration. Thus, canned fruits could be stored away at almost cold-storage temperatures and, with good insulation, held at a relatively low temperature.

THERE remains the consideration that the cans would not be dry and would, therefore, rust. But an artificial drying device could be designed. A blast of cold air no doubt could be employed to blow the bulk of the water from the can, and a blast of warm air could then be utilized to remove the remaining film. Possibly the bulk of the water could be removed by rolling the cans over a sponge belt which could be kept reasonably free from water by automatically passing it through a wringing device. A blast of warm air could then be employed to remove the adhering film of water.

It is not my intention to intimate that any definite device or design in this connection has been tried out and proved itself practical and satisfactory. I do have hopes of arousing the ingenuity of the machine manufacture, as it remains for him to design the equipment that the canner's needs demand. This whole scheme may seem impracticable on first thought. It must be borne in mind, however, that the developments in fruit canning have not reached their final stage, and where the future will lead, is not for me to say. I am positive, however, that the greatest obstacle in the sale of colored fruits is the deterioration in color and flavor of such fruits before they reach the consumer. It therefore behooves us all to leave no stone unturned that will make for a better preservation of these qualities.

*From a paper delivered before the Northwest Canners' Association, Portland, Ore., Jan. 5, 1931.

BOOK REVIEWS

WHEAT STUDIES BY THE FOOD RESEARCH INSTITUTE. Vol. VI. Published by Leland Stanford University, California, 1930. 476 pp., 11¼x8¾; cloth. Price, $10.

THIS volume assembles in bound form the ten subject studies on wheat that the Institute has published between November, 1929, and September, 1930. These studies treat in an authoritative manner the following subjects:

The Post-Harvest Depression of Wheat Prices; The World Wheat Situation, 1928-29 (review of the crop year); Survey of the Wheat Situation, August to November, 1929; The Contractility of Wheat Acreage in the United States; The Danube Basin as a Producer and Exporter of Wheat; Survey of the Wheat Situation, December, 1929 to April, 1930; Growth of Wheat Consumption in Tropical Countries; Japan as a Producer and Importer of Wheat; Survey of the Wheat Situation, April to July, 1930; The Changing World Wheat Situation: A Statistical Appraisal in Terms of Averages.

In addition to treating each of these subjects fully in the text pages, numerous graph charts and tables of statistical data are included. Each study is a complete individual unit and is obtainable as such if not desired as a part of the bound volume.

* * *

THE CONDENSED CHEMICAL DICTIONARY. Compiled and edited under supervision of Thomas C. Gregory and Isabelle M. Welch. Second Edition. Published by The Chemical Catalog Company, Inc. New York City, 1930. 551 pp., 9⅜x6½. Prices, $10 and 12.

THIS handy reference tool is a revision and enlargement of the 1919 edition. It includes 5,000 items not mentioned in the previous edition.

In addition to the 486 pp. devoted to 12,000 chemicals and other materials used in manufacturing and laboratory work, the book contains an appendix of 60 pp. This appendix includes 45 tables of technological value and a section defining 59 technical units.

The subjects treated are listed in straight alphabetical order with cross references. Many of the items are treated in semi-encyclopedic manner. In addition to the customary data given in handbooks on chemicals and materials, this dictionary gives manufacturing, packing, and shipping information pertaining to each substance.

The volume is equipped with an attractive and serviceable thumb index and is bound in board library buckram and in flexible keratol.

CHEMICAL ENGINEERING CATALOG. Fifteenth Edition. Published by Chemical Catalog Company, Inc., New York City, 1930. 1168 pp., 11⅞x9¼, illustrated; cloth. Prices: Free to those holding responsible positions in the chemical industry in U. S. A. and Canada; $3 to these chemical executives in other countries and to those in U. S. A. and Canada for permanent possession; $10 to others.

THIS catalog is compiled annually under the supervision of a committee appointed by the American Institute of Chemical Engineers, the American Chemical Society, and the Society of Chemical Industry. It contains condensed and standardized descriptive data regarding equipment, machinery, laboratory supplies, heavy and fine chemicals, and raw materials used in industries involving application of chemical engineering. The contents are well indexed under three classifications: alphabetical, trade name, and generic classification.

The last 71 pages are devoted to technical and scientific books pertaining to chemistry, chemical engineering, and allied subjects. This section is well indexed as to subject and author.

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THE BEVERAGE BLUE BOOK AND CATALOG. Compiled by *The Beverage Journal*. Third Edition. H. S. Rich & Company, Chicago, Ill. Cloth, 10¾x7½, 333 pp. Price, $10.

INFORMATION to be found in this book on all phases of the beverage industry—production, distribution, law, and finance—is unusually complete and well balanced for an assembled volume of its type. The text section of the book stresses technical and cost control in the industry. A summary of A.B.C.B. standards, recommended practices, and sanitary code, as well as a digest of state and federal food laws in their relationship to the industry comprise features of particular value.

A complete list of manufacturers of carbonated beverages and cereal beverages is arranged by states and towns, and a list of equipment and supply manufacturers is grouped according to products. The compilation includes a short summary of the work and a list of officers of the American Bottlers of Carbonated Beverages and the Beverage Allied Industries Council, as well as a list of officers of state bottlers' associations. It is well indexed.

WHAT'S ON YOUR MIND?

To the Editor of FOOD INDUSTRIES:

I have read with interest an article in your December issue entitled "Where Is the Inventor?"

I cannot agree with the contention that the responsibility for equipping retailers with refrigerator cases for the distribution of quick-frozen foods, or putting the idea over with the public, belongs to the refrigerator manufacturers. I do not believe they could be expected to do this, any more than the manufacturer of butcher fixtures should sell the retailer on the idea of putting in a meat department, or the tire manufacturer the idea that everyone should have an automobile.

The manufacturers of quick-frozen foods must sell the retailer and the public on their products, and then make it possible for the retailer to handle these foods at a profit and with safety.

I have recently seen at least several refrigerator cases in the test rooms of one of the large manufacturers of quick-frozen foods that apparently have met with all of the requirements of maintaining these foods at the desired temperature and properly displaying them. The food manufacturers must be in a position to assure the retailer that they can recommend a case that will allow him to handle these foods properly and profitably; and, also make available to him a sound, business-like plan whereby the equipment can be purchased without a large cash outlay, and on a payment basis that will allow the cost of the equipment to be charged to operating costs.

This can be accomplished with practically no credit risk to the food manufacturer, or the burden of collecting for the cases or servicing them, by adopting a plan which I am prepared to discuss with those who may be interested.

CROIL HUNTER
First Bancredit Corporation
New York City. St. Paul, Minn.

* * *

To the Editor of FOOD INDUSTRIES:

With my article, "Fatigue Reduction Increases Profits," in the December, 1930, issue of FOOD INDUSTRIES, a number of illustrations showing progress along this line in the bakery industry were published.

I call your attention to the fact that these photographs were obtained from J. J. Zeiter, director of safety insurance, department of Bakeries Service Corporation. It seems to me that credit for their use should be accorded to that organization.

C. O. SAPPINGTON, M. D.
Director, Division of Industrial Health,
Chicago, Ill. National Safety Council.

We regret that the photographs referred to by Dr. Sappington were published without credit to the Bakeries Service Corporation, and take this opportunity to offer our apologies.—*The Editor.*

PATENT DIGEST

Baking and Milling

Flour Bleached by Benzoyl Peroxide and Benzoic Acid—Henri C. J. H. Gelissen, Deventer, Netherlands, and Franciscus Visser't Hooft, Buffalo, N. Y., to Novadel-Agene Corporation, Newark, N. J. No. 1,773,989. Aug. 26, 1930.

Batch Feeders for Doughnut Machines—Charles E. Carpenter, Chicago, Ill. No. 1,776,780. Sept. 30, 1930.

Bread-Slicing Machine—Harry J. Criner. One-half to A. G. Bush, Davenport, Iowa. No. 1,778,007. Oct. 14, 1930.

Automatic Machine for Baking Pastry in Hot Oil Bath—George Reiber, Rochester, N. Y. No. 1,781,411. Nov. 11, 1930.

Continuous Dough-Moulding Machine—Laurence S. Harber to Baker Perkins Company, Inc., Saginaw, Mich. No. 1,781,546. Nov. 11, 1930.

Automatic Pie-Filling Machine—Harvey A. Beilgard, Hollywood, Calif. No. 1,782,596. Nov. 25, 1930.

Meal Made From Roasted Green Corn—Harry Adrian Erysin, Malden, Mass. and Krikor B. Chickering, Brockton, Mass. No. 1,782,960. Nov. 25, 1930.

Oven for Toasting and Shredding Biscuits—John Leonard Kellogg to Kellogg Company, Battle Creek, Mich. No. 1,783,434. Dec. 2, 1930.

Whipping and Mixing Machine—William L. Laib, Oak Park, Ill. No. 1,783,437. Dec. 2, 1930.

Grading and Purifying Yeast—Gustave T. Reich, Drexel Hill, Pa. No. 1,783,521. Dec. 2, 1930.

Beverages

Continuous Coffee Roaster Heated Electrically—Albert K. Rehe; one-half to Reginald A. Kucich, San Francisco, Calif. No. 1,783,673. Dec. 2, 1930.

Canning and Glass Packing

Can With Pouring Nozzle and Reclosure—Joseph Dister, Hamilton, Ohio, to American Can Company, New York City. No. 1,773,263. Aug. 19, 1930.

Can-Body Maker—John F. Peters, Rochester, N. Y., to American Can Company, New York City. No. 1,773,277. Aug. 19, 1930.

Vacuum Fruit-Jar Cover—Dan Killen, Milwaukee, Wis. No. 1,773,311. Aug. 19, 1930.

Sanitary Food Container and Method for Opening It—Heinrich Karl. Jersey City, N. J. No. 1,773,362. Aug. 19, 1930.

Cans Sealed and Dated Mechanically—John Coyle, Baltimore, Md., to Continental Can Company, New York, N. Y. No. 1,783,109. Nov. 25, 1930.

Closure Cap in Two Pieces—Edgar Scofield, New York, N. Y., to Anchor Cap and Closure Corporation, Long Island City, N. Y. No. 1,783,314. Dec. 2, 1930.

Case-Filling Machine—Charles H. Wild to Burt Machine Company, Inc., Baltimore, Md. No. 1,784,083. Dec. 9, 1930.

Can Forming Machine With Electric Control—Walter K. Cabot, Montclair, N. J. to American Can Company, New York, N. Y. No. 1,784,131. Dec. 9, 1930.

Fruit-Pitting Machine—Giovanni Frova, Milan, Italy. No. 1,784,347. Dec. 9, 1930.

Can Making Machinery Electrically Controlled—Lyman L. Jones, Seattle, Wash. to American Can Company, New York, N. Y. No. 1,784,358. Dec. 9, 1930.

Confectionery

Enrober Equipped to Keep Coating Free From Confection Particles—Joseph Piccolo and John W. Villano, Brooklyn, N. Y. No. 1,756,471. April 29, 1930.

Caramel Wrapping Machine—Alfred German Rose to Rose Brothers, Ltd., Albion Works. Gainsborough, England. No. 1,758,468. May 13, 1930.

Cream Fondant Produced Continuously by Two-Stage Process Using Sugar Syrup—Ronald Head, Lupton, England, to Baker Perkins Company, Inc., Saginaw, Mich. No. 1,758,602. May 13, 1930.

Chocolate Cups for Plastic or Liquid Fillings—Alexander D. Fisher, Toronto, Ontario, Canada. No. 1,760,900. June 3, 1930.

Delivery Belts of Confectionery Depositors Coated to Prevent Sticking—Alonzo Linton Bausman to National Equipment Company, Springfield, Mass. No. 1,761,064. June 3, 1930.

Individual Fruit or Nut Centers Automatically Placed in Molds Before Coating—Alonzo Linton Bausman to National Equipment Company, Springfield, Mass. No. 1,763,083 and 1,763,084. June 10, 1930.

Open-End Chocolate Shells—Alonzo Linton Bausman to National Equipment Company, Springfield, Mass. No. 1,763,085. June 10, 1930.

Candy Cutting Machine That Returns Trimmings to Supply Tank—William Bartlett Laskey to Mason, Au & Magenheimer Confectionery Manufacturing Company, Brooklyn, N. Y. No. 1,765,873. June 24, 1930.

Dairy and Egg Products

Continuous Ice Cream Freezer—Albert C. Wood, Philadelphia, Pa., and Thomas Hall, Harrisburg, Pa. No. 1,765,710. June 24, 1930.

Milk-Can Washing Machine—Harry D. Lathrop, Chicago, Ill. No. 1,770,931. July 22, 1930.

Multi-Chambered Pasteurizer With a Central Valve Body for Discharge Purposes—Halvor Holte, Skien, Norway. No. 1,772,998. Aug. 12, 1930.

Milk-Can Washing Machine—Olaf Larsen, Fort Atkinson, Wis., to Creamery Package Manufacturing Company, Chicago, Ill. No. 1,774,981. Sept. 2, 1930.

Intermittent Drive for Endless Conveyors on Can-Washing Machines—Irving R. Hippenmeyer. Waukesha, Wis., to Creamery Package Manufacturing Company, Chicago, Ill. No. 1,775,029. Sept. 2, 1930.

Continuous Ice Cream Freezer—Clarence W. Vogt to Vogt Instant Freezers, Inc., Louisville, Ky. Nos. 1,783,864, 1,783,865, 1,783,866, and 1,783,867. Dec. 2, 1930.

Protective Cap for Milk Bottles—Frank J. MacDonald, Ellet, Ohio; one-half to John R. Gammeter, Akron, Ohio. No. 1,783,909. Dec. 2, 1930.

Double-Walled Egg Carton—Joseph L. Coyle, London, Ontario, Canada, to Leon Benoit, Chicago, Ill. No. 1,784,275. Dec. 9, 1930.

Milk Can Washing Machine—Hermann Krause to Stout Manufacturing Company, Menomonie Falls, Wis. No. 1,785,352. Dec. 16, 1930.

Fruits and Vegetables

Fruit and Vegetable Shredding Machine—Whitney Wallace Jones, Baltimore, Md. No. 1,766,824. June 24, 1930.

Cabbage Slicer—Whitney W. Jones, Baltimore, Md., and John H. Bailey, Phelps, N. Y. No. 1,766,825. June 24, 1930.

Fruit Simultaneously Graded, Cleaned, and Polished—Thomas F. Griffin and Frank Smith, Pinehurst, N. C. No. 1,770,916. July 22, 1930.

Dried Fruit Heated and Sprayed With Edible Oil to Prevent Deterioration—Thomas W. Forrest to Sun-Maid Raisin Growers of California, Fresno, Calif. No. 1,773,425. Aug. 19, 1930.

Adjustable Sizing Machine for Sorting Citrus Fruits—Bronson C. Skinner to Florida Citrus Machinery Company, Dunedin, Fla. No. 1,775,739. Sept. 16, 1930.

Surface Treatment of Fruit to Prevent Deterioration—Ernest M. Brogden, Pomona, Calif., to Brogdex Company, Los Angeles, Calif. No. 1,786,405. Dec. 23, 1930.

Adjustable Fastener for Fruit Baskets—Oliver O. Kendall to Enos B. Hiatt, Denver, Colo. No. 1,787,202. Dec. 30, 1930.

General Equipment

Continuous Centrifugal Separator—William C. Walker, New York City. No. 1,767,905. June 24, 1930.

Liquids Measured Automatically—Benjamin H. Dupuy, New Orleans, La. No. 1,769,499. July 1, 1930.

Rotary Pump for Mixing and Feeding Fuel to Oil-Burning Furnace—William J. Press, Ottawa, Ontario, Canada. No. 1,769,647. July 1, 1930.

Mixing or Emulsifying Apparatus With Fixed Beater and Rotating Container—Samuel B. Drucker, Brooklyn, N. Y. No. 1,772,073. Aug. 5, 1930.

Heavy-Duty Platform Scales Made More Sensitive for Accurate Reading—Walter S. Smith, Columbus, Ohio. No. 1,772,294. Aug. 5, 1930.

Apparatus and Method for Fumigating—Ralph M. Jackson, La Habra, Calif., to Owl Fumigating Corporation, New York City. No. 1,773,582. Aug. 19, 1930.

Sterilization of Sewage or Water Without Formation of Chlorine Hydrate—Charles F. Wallace, Westfield, N. J., to Wallace & Tiernan Company, Inc., Belleville, N. J. No. 1,777,987. Oct. 7, 1930.

Liquid-Sampling Device—John M. Mayhall and Howard C. Morrison, Milwaukee, Wis. No. 1,780,597. Nov. 4, 1930.

Liquid-Measuring Device—John M. Mayhall and Howard C. Morrison, Milwaukee, Wis. No. 1,780,598. Nov. 4, 1930.

Viscosimeter—Ernest M. Symmes, to Hercules Powder Company, Wilmington, Del. No. 1,780,952. Nov. 11, 1930.

General Processes and Products

Measured Quantities of Materials Roasted in a Continuous Manner—Joseph L. Rosenfield, Alameda, Calif. No. 1,773,202. Aug. 19, 1930.

Cereal Breakfast Food Mixture Containing Diastatic Malt—David Julian Block to Edward Block, Chicago, Ill. No. 1,773,296. Aug. 19, 1930.

Potassium Silicate Detergent—Alfred H. Cowles, Sewaren, N. J., to Electric Smelting & Aluminum Company, Cleveland, Ohio. No. 1,774,872. Sept. 2, 1930.

Fish Oil Clarified by Centrifuging—Lawrence A. Taylor and Alan Osbourne, San Francisco, Calif., to Sharples Specialty Company, Philadelphia, Del. No. 1,775,740. Sept. 16, 1930.

Removal of Caps From Honeycombs and Recovery of Honey From the Caps—William T. Grau, Jefferson, Ohio. No. 1,779,469. Oct. 28, 1930.

Boiler Water Purified by Blowing Off and Adding Make-up Water—Roy O. Hensgey, Oconomowoc, Wis. No. 1,786,113. Dec. 23, 1930.

Vegetable Adhesive—Walter Alexander, White Plains, N. Y. No. 1,786,417. Dec. 30, 1930.

Cold-Storage Rooms Deodorized by Means of Activated Carbon—Gilbert C. Bacon, Tamaqua, Pa., to Darco Corporation, Wilmington, Del. No. 1,787,231. Dec. 30, 1930.

Meat Packing

Preparation of Smoke Aroma and Flavor for Meat Products—Julius Alsberg, New York City, to B. Heller & Company, Chicago, Ill. No. 1,777,026. Sept. 30, 1930.

Making and Molding of Scrapple—Charles H. Vogt, Philadelphia, Pa. No. 1,786,372. Dec. 23, 1930.

Dried Blood Plastics—Felix Homberg, Barmen, Germany, to American Nuplex Corporation, New York City. No. 1,786,488. Dec. 30, 1930.

Sugar and Molasses

Crystallizer With One Submerged and One Partially Submerged Helical Stirrer—William G. Hall, Manila, Philippine Islands. One-half to Roy C. Pitcairn, Honolulu, Hawaii. No. 1,769,779. July 1, 1930.

Beet Molasses Treated for Use in Yeast Manufacture—Robert Hamburger and Stefan Kaesz, Freudenthal, Czechoslovakia, to Standard Brands, Inc., Dover, Del. No. 1,770,402. July 15, 1930.

Vitamins

Photocatalyst Production of Anti-rachitic Substances—August J. Pacini, to Charles M. Richter, Chicago, Ill. No. 1,771,343. July 22, 1930.

Quick-Frozen Fruit Juices—Clarence Birdseye, Gloucester, Mass., to Frosted Foods Company, Inc., Dover, Del. No. 1,775,549. Sept. 9, 1930.

ABSTRACTS OF CURRENT LITERATURE

CONTROL OF THERMOPHILIC BACTERIA IN PASTEURIZING PLANTS. M. W. Yale and R. S. Breed. *American Journal of Public Health*, Vol. 20, p. 1192; November, 1930.

Studies on the development of thermophilic bacteria at five large pasteurizing plants with runs of 5 to 6 hours' duration have shown that faulty plant operations are more important factors in the development of such bacteria than the type of pasteurizing equipment used. The raw supply of these plants contained only a few thermophiles. The following factors were found to be important causes of development of thermophiles: (1) prolonged holding of milk at pasteurization temperature; (2) repasteurization; (3) cooking of milk solids on the walls of heaters; and (4) continuous use of filter cloths for a number of hours, during which milk was allowed to stand hot in the filter during stops.

* * *

SPOILAGE OF THOUSAND ISLAND DRESSING. Carl F. Pederson. *Journal of Bacteriology*, Vol. 20, p. 99; August, 1930.

Spoiled Thousand Island dressing was dark in color and showed some separation of oil. Its composition was corn oil, vinegar, egg yolk, sugar, paprika, mustard, pepper, pickles, olives, and chili sauce. A spore-forming organism found was traced to the pepper, paprika, and mustard, with the first two as the predominant source of the spoilage organism. As a means of preventing further losses, the author suggests sterilizing the pepper and paprika used in the dressing, making the product of sufficient acidity to prevent growth of the organism.

* * *

CONTROL OF DISCOLORATION OR YELLOWING OF HALIBUT. Robert H. Bedford. Progress Report No. 7 of the Pacific Biological Station, Biological Board of Canada, December, 1930.

The yellow discoloration of the bellies of halibut has been shown to be due to infection with bacteria coming both from the ice in which the halibut is packed and from the decks and gear of the fishing vessels. A method has been developed which appears to control this discoloration in a rather simple manner. The fish are submerged in a 20 per cent salt solution for 30 minutes and then stowed in the hold in cracked ice. The report states that the fish do not become salty and that trial shipments indicate the method has much to recommend it.

VINEGAR. U. Pratolongo. *Giornale di chimica industriale ed applicata*, Vol. 12, pp. 335-40; July, 1930.

A study has been made of the chemical differences between artificial and fermentation vinegars, and between grape-wine vinegar (or its blends) and other wine vinegars. In view of legal limitations on the use of coloring matter and inorganic acids, tests for these substances in vinegar also are discussed. Fermentation vinegar can be distinguished from the artificial product by a photometric method (luminescence measurement), but the Janke-Popberger procedure for determining the iodine number is more reliable and easier to carry out. Grape-wine vinegar differs from other fruit vinegars in lower ash content, lower alkalinity of ash, lower ash-extract ratio and higher ratio of fixed acidity to alcohol and acetic acid content. The alcohol-extract ratio is about 0.3 to 0.4 in red wines and 0.5 to 0.6 in white wines. It remains about the same in the vinegar from these wines, even after diluting with water to the legal limit.

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PRESERVING FATS. J. A. van Deurs. *Seifensieder-Zeitung*, Vol. 57, p. 530; July 24, 1930.

A method has been developed for preserving (for storage) raw materials for edible fat manufacture, the fat content being higher than 8 per cent. The treatment is applicable to cod livers, herring, palm fruits, copra, and numerous oil-bearing seeds. It depends on surrounding the material with an acid medium, in which the pH may vary between 5 and 1. The acidity may be imparted by cultures of acidifying bacteria or by use of substances giving an acid reaction in water. It has been found that materials so treated do not change, even during prolonged storage, either by fat hydrolysis, oxidation, discoloration, or absorption of foreign matter from the surroundings. The method is patented in Denmark (Danish Patent No. 42,399) by J. A. van Deurs.

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A NEW METHOD FOR MAKING CAKE. C. A. Glabau. *Bakers Weekly*, Vol. 67, p. 47, Aug. 2, 1930; p. 50, Aug. 9, 1930; p. 49, Aug. 16, 1930; p. 55, Aug. 23, 1930; p. 53, Aug. 30, 1930.

The sugar, shortening, eggs, flour, and other ingredients are all put into the mixer at once. Baking was carried out at 330 deg. F. for a period of 1½ hours. Two vertical mixers were used in the testing of pound cake, white layer and white loaf cakes, and sponge cake made according to the new method. The following variables and their effect were studied: various rates and times of mixing speeds used, effect of mixture with 0.5 per cent baking powder added, and the way in which the baking powder was added. Consumer reaction tests were made with several cakes made according to the conventional method and also according to the new method. Preference in favor of the cake made according to the new method varied from 2 to 1 for some cakes, to 3 to 1 for other cakes.

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LARGE-SCALE EXPERIMENTS IN SULPHURING APRICOTS. E. M. Chace, C. G. Church, and D. G. Sorber. *Industrial and Engineering Chemistry*, Vol. 22, p. 1317; December, 1930.

In the commercial process used for sulphuring apricots it has been found that the appearance of dried fruit is correlated with sulphur dioxide content. Important factors are the concentration of gas and length of sulphuring period, while temperature of sulphuring is of much less importance. Good fruit results after treatment with 3 per cent of gas for 2 hours at 100-110 deg. Fahrenheit.

* * *

THE NEW WHEAT FLOUR OF THE NORTHWEST. C. A. Glabau. *Bakers' Weekly*, Vol. 68, p. 51; Nov. 22, 1930.

The new wheat runs higher in protein and has a very fine color. The gluten of the standard patent flour has a greater resistance to moisture, which may have some effect upon dough temperature, mixing time, and fermentation time. There is an increase in the ash content, ranging from 0.01 to 0.02 per cent over that of last year for the same grades of flour.

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BAKERS' YEAST FROM WASTE. Schwenninger. *Zeitschrift des Vereins deutscher Ingenieure*, Vol. 74, p. 1412; Oct. 11, 1930.

As a means of utilizing the sugar content of waste sulphite liquor from pulp mills, G. Heykenskjöld, a Swedish inventor, has developed a process for producing pure strains of bakers' yeast from a mash in which the nutrient sugar is derived from the waste liquor. A factory has been built in Finland to operate this process, and patent protection has been obtained in America. The factory in Finland, built for an annual production capacity of somewhat more than 400 tons, reached this rate of production in about six months after operations began. Improvements in the process have now approximately doubled the capacity of this factory. An important feature of the process is proper aeration of the fermenter to prevent alcoholic fermentation. The air for this purpose is carefully purified and passed through a coke filter wet with caustic soda solution.

SYNTHETIC VANILLIN. J. Schwyzer. *Chemiker-Zeitung*, Vol. 54, pp. 817-8, 839; Oct. 22 and 29, 1930.

Clove oil, the original source of eugenol for manufacture of synthetic vanillin, was too expensive to allow the industry to expand as rapidly as the demand increased. The resulting search for a cheaper raw material led to three new syntheses, one starting from pyrocatechol, one from piperonal, and one from guaiacol. The principal American contribution to commercial vanillin synthesis has been the recent development of the ozone oxidation process, which has made it possible to utilize isoeugenol (or acetisoeugenol) as well as eugenol. This process is bringing clove oil back into favor as a raw material, particularly where cheap electric power is available for making ozone.

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VITAMIN B. A. G. van Veen. *Chemisch Weekblad*, Vol. 27, pp. 369-71; June 14, 1930.

The government of Java, in its food laboratory at Weltevreden, has utilized the method worked out by Jansen and Donath for isolating vitamin B, much needed in the tropics for combating beri-beri. This is an enterprise for which there is relatively little demand in Europe and America; but in the Dutch East Indies and other colonies, where there is much less diversity of diet, there is much need for vitamin preparations. The Jansen and Donath method depends on the use of acid clay to adsorb the vitamin from its solutions; for example, from a rice bran extract. The acid clay is a special grade of kaolin, suitably treated so that its adsorption capacity is much superior to that of ordinary kaolin. In the laboratory at Weltevreden, the extract is made by steeping rice bran in acidulated water. About 3 kilos (6.5 lb.) of acid clay is needed to adsorb the vitamin from the extract from 100 kilos (220 lb.) of rice bran, representing about 1,400 kilos (3,100 lb.) of brown rice. The extraction is carried out on the counter-current principle in wooden vats of 1,500 liters (about 400 gal.) capacity. The activated clay is then filtered, washed, treated with a preservative (disinfectant), and dried. Most of the output is made up into tablets, and supplied to fishing boats, famine districts, settlements with limited food supply, or wherever there is need on account of the beri-beri hazard.

* * *

VITAMINS IN OLIVE OIL. L. Margaillan. *Comptes rendus de l'Academie des Sciences*, Vol. 191, pp. 725-7; Oct. 27, 1930.

Ordinary olive oil is not comparable in vitamin potency with nut oil, butter fat, or cod liver oil. But the raw virgin oil is not commonly found on the market; consumer demand has led to the production of bleached, deodorized oil in which the acidity has been more or less neutralized. Experiments with rats have been carried far enough to show conclusively that the low vitamin potency of commercial edible olive oil is due to losses in manufacture, not to an inherent deficiency. Further tests will be made to ascertain the stage or stages in which these losses occur during the processing of the virgin oil.

* * *

FREEZING OF GELATIN. Kyoji Kinoshita. *Bulletin of the Chemical Society of Japan*, Vol. 5, pp. 261-6; September, 1930.

Experiments indicate that water of hydration is very loosely combined in gelatin gels, when the colloid concentration is lower than about 15 per cent, but is much more strongly held in more concentrated gels; say, 20 per cent or stronger. This is shown by the behavior of the gels on freezing; at the lower concentrations freezing causes phase separation (ice and a more concentrated gel), whereas a more concentrated gel freezes as such. In very concentrated gels (40-60 per cent) the freezing point curve is asymptotic to the concentration axis. This probably means that part of the water of hydration is very firmly held, either in actual chemical combination or in solid solution. Such gels may be formed as one phase in the freezing of low-concentration (5-15 per cent) gels, which form alternate layers of ice and concentrated gel, concentric with the vessel walls. Starch gel freezes to a white mass, in which phase separation occurs as thawing proceeds, drops of water being secreted. Agar gels are also white when frozen, and secrete drops of water as they thaw. Freezing becomes progressively more difficult as the concentration increases; a 60 per cent gelatin gel freezes at — 12.65 deg. centigrade.

GOVERNMENT PUBLICATIONS

DOCUMENTS ARE AVAILABLE *at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated, pamphlet is free and should be ordered from bureau responsible for its issue.*

Beef Reports. Two U. S. Department of Agriculture documents as follows: Technical Bulletin 203, Beef Production From Purebred Grade, and Native Calves, by Arthur T. Sample and H. E. Dvorachek, 5 cents; and Leaflet 67, Beef Grading and Stamping Service, by W. C. Davis, 5 cents.

Commerce Yearbook. Vol. I. The United States. U. S. Department of Commerce; $1. Contains detailed information regarding business conditions in the United States. 1930.

Beef From Calves Fed Grain. U. S. Department of Agriculture, Technical Bulletin 208; 10 cents.

Peaches for Canning, by Charles W. Culpepper and Joseph S. Caldwell. U. S. Department of Agriculture, Technical Paper 196; 10 cents. Describes the canning quality of certain commercially important Eastern peaches.

Recommendations on Livestock Production, by John R. Mohler. U. S. Department of Agriculture, Miscellaneous Publication 81; 5 cents.

Census of Manufactures. Bound Volume issued by Bureau of the Census; $2.25. Statistics compiled by the 1927 Biennial Census of Manufactures.

Canned Beans Specifications. Three specifications from the Federal Standard Stock Catalogue Board, as follows: JJJ-B-91, canned beans with pork; JJJ-B-96, canned beans without pork; and JJJ-B-106, dry beans.

Dairy Products Manufacture. Bureau of Agricultural Economics, mimeographed sheets giving statistics for 1929, by months.

Salad-Dressing Data. Bureau of Foreign and Domestic Commerce, mimeographed document. A survey of the mayonnaise, salad dressing, and related products industries, 1929, with data on production and distribution.

Commercial Statistics of U. S. Bureau of Foreign and Domestic Commerce, Statistical Abstract of the United States, 1930; $1.

Import and Export Data. Bureau of Foreign and Domestic Commerce, Foreign Commerce and Navigation of the United States, Calendar Year 1929, in two volumes. Vol. I, $1.50; Vol. II, $1.

Specifications Index. Federal Standard Stock Catalogue, Section IV, Part 1; 5 cents. Listing of federal specifications covering all types of commodities in the Federal Standard Stock Catalogue, which relates to all sorts of materials purchased by the government for its own use. Specifications indexed are often suitable for industrial use also.

Production Statistics, 1929. Preliminary mimeographed figures from the Census of Manufactures on: coffee and spice, roasting and grinding; peanuts, walnuts, and other nuts, processed; biscuit and crackers; and chocolate and cocoa products.

Commercial Survey of the Pacific Southwest, by C. R. Niklason. Bureau of Foreign and Domestic Commerce, Domestic Commerce Series 37; $1.85. Trade review of value to merchandising managers.

The United Kingdom, an Industrial, Commercial, and Financial Handbook. Bureau of Foreign and Domestic Commerce, Trade Promotion Series 94; $1.75. Trade review of value to merchandising managers.

Selling Canned Foods. Bureau of Foreign and Domestic Commerce, Merchandising Research Division mimeographed document. One of a series of commodity studies from the Louisville grocery survey.

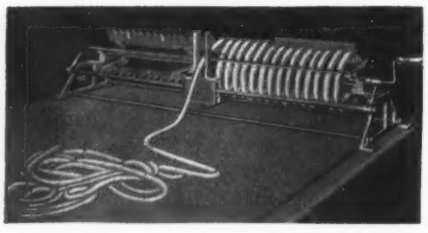
NEW EQUIPMENT FOR FOOD MANUFACTURERS

Sausage Linked on Smoke Reel

A RECENT development in packing-house equipment puts uniformity in length of links and in appearance of smoked sausages within reach of the small sausage maker. Although the Linkreel, manufactured by the Globe Company, 818-26 West 36th St., Chicago, Ill., does not have the high volume capacity of the power-driven automatic linking machines, it is said to cut down cost of producing smoked sausages.

The illustration indicates how the stuffed casings are wound on the reel to give links of equal length and how they are crimped into the notches to prevent slipping or tearing. The reel when filled can be removed from the winding frame placed on trucks preparatory to going to the smokehouse. Inasmuch as the sausages are supported only at the link joints, all portions of their surface are exposed to smoking conditions. This equal exposure is said to result in a finished product uniform in appearance and in degree of cooking.

In this manner sausages are linked and prepared for smoking in one operation and are smoked without the finished



product having a small portion on each link unsmoked and only partly cooked because of contact with a smoke stick. The reel is adjustable to give links from 3 to 5½ in. long and is made to fit truck equipment already in use in sausage plants.

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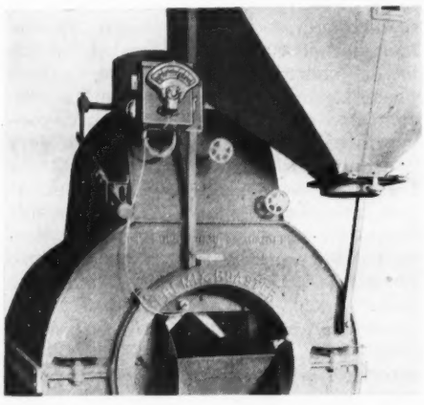
New Roaster Equipment

A NEW ITEM in roasting equipment has been added to the line of Jabez Burns & Sons, Inc., 11th Ave. and 43d St., New York City, which consists, in part, of a dial-type indicating thermometer actuated by a thermocouple which extends into the mass of roasting coffee or cocoa beans, peanuts, cereals, and the like. The dial is fitted with a movable contact point connected with a battery-operated signal bell, which also is connected with the temperature indicator.

In practice the contact point is set at a temperature-reading of five or so degrees lower than the predetermined optimum roasting temperature. When the pointer, indicating the temperature inside the roasting mass, closes the circuit by touching the movable contact point, the signal bell warns the operator that the mass in the roaster has almost reached the optimum roasting temperature.



The value of this signal is twofold: it permits the operator to engage in other duties while waiting for the roasting mass to reach the optimum roasting temperature and aids the operator in producing uniformly roasted products. It is not offered as a means of automatic roasting but as a warning signal to prevent over-roasting while the operator is engaged in other duties. Also it acts as a safeguard against over-roasting due to negligence or carelessness on the part of the operator.

The illustration shows this "Thermomaton" installed on a standard type roaster.

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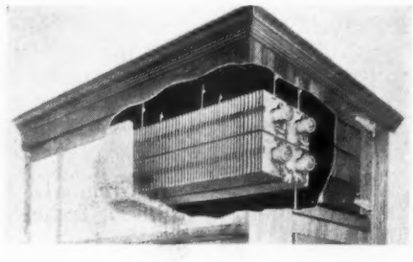
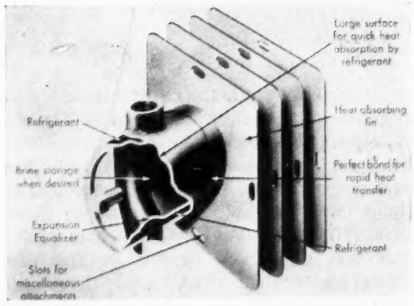
Frostless Cooling Units

MECHANICAL refrigeration that does not dry out foods, that causes no accumulations of frost on the cooling units, and that is easily installed is the objective of Hydro-Thermal Grids, a new product of the American Engineering Company, Cumberland St., Philadelphia, Pa.

A grid consists of an inner tube, which spreads the refrigerant into a





thin layer and, when necessary, serves as a storage place for the refrigerant, and of an outer tube with fins to give a large heat-absorbing surface in a small space. The grids are made with fins of three sizes and of a variety of lengths, so that they can be assembled into cooling units of any size and shape. They are applicable to any methyl chloride or ammonia system and are suitable for use in refrigerators, coolers, and refrigerated cases.

The refrigerant enters at one end of the grid and, regardless of how many grids there may be in the unit, escapes at the other end in such a way that its travel through the unit is no greater in length than that of a single grid.

Because of the large heat-absorbing area, it is not necessary to operate these grids at the low temperatures ordinarily required in mechanical refrigeration. As a result, they are not so likely to incase themselves in thick layers of frost, as coils do, and meats or other foods in the refrigerators and cases retain their natural moisture and full weight. Also periodical defrosting of the cooling units is unnecessary and the refrigerating system becomes automatic.

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High Capacity Centrifuge

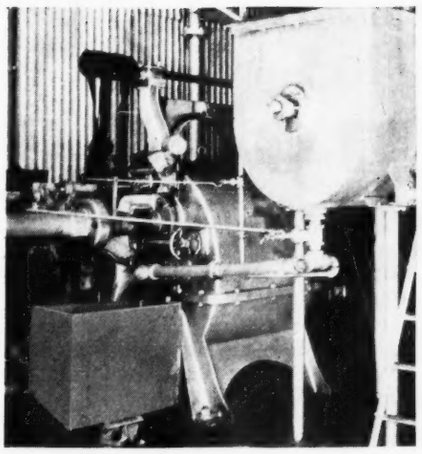
ALTHOUGH previously used in other industries, the horizontal centrifugal is a newcomer in the processing of American food materials. The accompanying illustration shows an installation in a California plant for separating casein curd from the whey, made by the Sharples Specialty Company, 23d and Westmoreland Sts., Philadelphia, Pa.

Rotation of the basket through a vertical plane at 750 r.p.m. for the 48-in. size and 500 r.p.m. for the 63-in. size is said to give a cake of uniform thickness. When the cake has reached the desired thickness the flow of material into the unit is cut off, rinsing water is run in, and, without stopping the centrifuge, the washed cake is removed by means of a movable knife that throws the cake from the unit as it is scraped from the basket.

If a solid basket and a siphon attachment be used, cloudy liquids may be clarified in a continuous manner.

Careful location and operation of valves in connection with the use of a perforated basket make possible the separation and recovery of the liquid and solid materials and of the wash water.

The speed with which the unit is



loaded and unloaded is said to give high production. This type of filter finds application in processing of rice, potato, and corn starches; manufacture of sugar and molasses; and treatment of wine lees in Europe.

For those industries desiring lower production capacity a 20-in. size is available.

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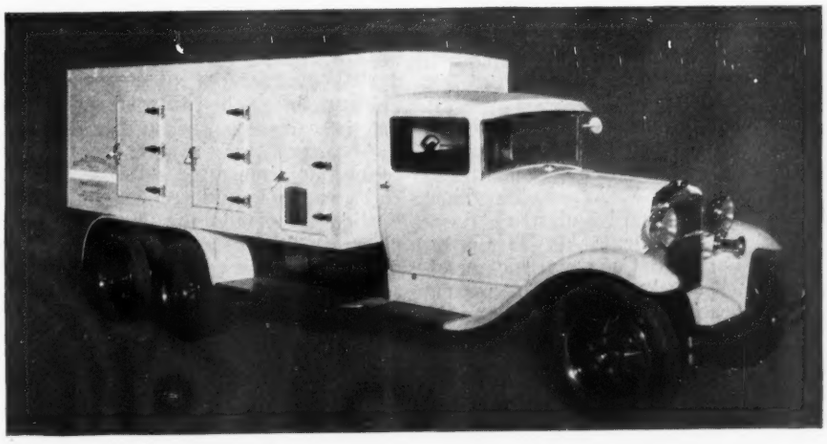
Truck Cooled Mechanically

A MECHANICALLY refrigerated truck, manufactured by the Motor Vehicle Refrigeration, Ltd., Oakland, Calif., is said to maintain a temperature of 0 deg. F. and to be capable of operating under diversified climatic and altitude conditions. Reduction in the cost of operating refrigerated trucks and an increase in the pay load is claimed as a result of preliminary tests.

Refrigeration is obtained by a small compressor that operates from 200 to 2,200 r.p.m. It gets its power to compress the refrigerant gas and send it through the refrigerating coils by means of power take-off from the transmission. The refrigerant starts from the storage tank in a liquid form, is brought into the cooling coils through a direct expansion valve, and vaporized. It is then pumped back to the compressor, where it is compressed to 80 lb. pressure, sent to the air-cooled radiator, and again enters the storage tank in liquid form. The unit is compactly and sturdily designed, so that jarring of the truck cannot cause it to give trouble.

The bodies are constructed of durable material, well insulated, and highly efficient in retaining low temperatures. The truck illustrated is a model to be used for the transportation of ice cream. It has a capacity of 350 gal. of ice cream in bulk and approximately 600 gal. in brick form. The body weight is 4,000 lb., allowing a safe margin of over 3,000 lb. for pay load. The company is formulating plans to manufacture ice cream trucks ranging in capacity from 150 gal. to 1,000 gal. and also to build units to carry meat, fish, milk and other perishables.



MANUFACTURERS' PUBLICATIONS

Cork Insulated Tanks—Armstrong Cork & Insulation Company, Lancaster, Pa., has prepared a reprint folder from the Portland Cement Association Publication, describing the construction of a cork insulated concrete tank.

Bronze Valves—Various types and sizes of standard bronze valves are fully described in Bulletin No. 121, prepared by Jenkins Brothers, 80 White St., New York City.

Electric Heaters—In an illustrated folder, the Buffalo Forge Company, Buffalo, N. Y., announces and describes its Model B unit electric heater of the Breezo tin type.

Cereal Cleaning—A 16-page booklet, devoted to the Carter Millerator, designed for cleaning grains before milling, has been published by the Carter-Mayhew Manufacturing Company, Minneapolis, Minn.

Selection Charts for Centrifugal Pumps—Goulds Pumps, Seneca Falls, N. Y., has prepared the second of the series of selection charts for centrifugal pumps, known as Bulletin No. 201. This booklet covers multi-stage pumps for capacities up to 2000 g.p.m.; heads up to 2400 ft. Contains much valuable material concerning centrifugal pumps, as well as complete description of Goulds line of horizontally split multi-stage centrifugal pumps.

Special Process Machinery — In a well-bound 78-page booklet, fully illustrated, the J. H. Day Company, Cincinnati, Ohio, describes its line of special machinery designed for diversified processes.

Four-Cylinder Truck Chassis—The White Company, Cleveland, Ohio, illustrates and gives specifications of a Model 160 four-cylinder truck designed for use as a delivery truck in the baking industry.

Air Operated Temperature Control Equipment—Catalog 4000, prepared by the Bristol Company, Waterbury, Conn., is a 20-page booklet illustrating and describing instruments designed to give temperature control to operating machinery.

Rotary Ovens—Steam type rotary ovens fired by oil, gas, coke, or coal, are illustrated and described in a folder prepared by the Baker Perkins Company, Saginaw, Mich.

Automatic Water Stills—Catalog B, prepared by Barnstead Still & Sterilizer Company, Lanesville Terrace, Forest Hills, Boston, Mass., consists of seven sections composed of loose-leaf material, illustrating and describing water distilling equipment for various uses.

A Guide to Productive Lighting for Industry—A 48-page booklet compiled by the illuminating engineering department, Benjamin Electric Manufacturing Company, Des Plaines, Ill., contains charts, photographs, illustrations and diagrammatic study charts, illustrating poor and good industrial lighting. Lighting equipment, illumination calculation, and recommended foot-candle intensities are included.

Lift Truck Equipment—Featuring 4-way platforms and other special purpose racks for lift truck uses, Lewis-Shepard, Watertown Station, Boston, Mass., in an illustrated folder, calls attention to its lift trucks and lift truck equipment.

The Story of Vanilla—An attractively bound, well-illustrated booklet of 32 pages devoted to the history of vanilla, its cultivation, and its preparation for market is available through Thurston & Braidich, 27 Cliff St., New York City. The booklet also contains information regarding vanilla extract and other pure flavoring extracts.

Self-Vulcanizing Rubber Compound—In a 12-page illustrated booklet, the Hitchcock Company, 48 Pearl St., Boston, Mass., describes and gives uses for "Covulc," a rubber compound that is said to give more resistance to abrasion than does metal.

Electric Welding — In a 20-page illustrated booklet known as Bulletin No. 14, the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., gives considerable data on costs and illustrates applications of arc welding. In a 32-page illustrated booklet, entitled "The Arc Welding of Structural Steel" the process is treated historically and technically. Valuable professional information is contained in this booklet.

Double-Discharge Boxing Machine—The New Way Canning Machine Company, Hanover, Pa., announces its duplex boxing machine and describes its simplex boxer in a 4-page leaflet. Each type of machine is illustrated.

Sodium Metasilicate — This detergent is discussed in a leaflet reprint from Silicate P's & Q's Vol. 10, No. 7, published by the Philadelphia Quartz Company, Philadelphia, Pa.

Flavors and Organic Chemicals—Essential oils, aromatic chemicals, certified colors, and flavoring materials are listed and priced in a 32-page catalog issued by Magnus, Mabee & Reynard, 32 Cliff St., New York City.

Gas Heaters—Industrial unit heaters that burn gas are described in a leaflet published by the Buffalo Forge Company, Buffalo, N. Y. Known as Bulletin No. 2754.

Bakery Equipment—In a condensed leaflet catalog, the Peerless Bread Machine Company, Sidney, Ohio, illustrates and describes its various types of baking equipment.

Trucks and Profits in Food Wholesaling—A bound 24-page booklet published by the General Motors Truck Company, Pontiac, Mich., reports a survey on truck operation in wholesale food business; dealing with such subjects as present trends in food wholesaling, cutting costs on truck operation, turning truck savings into profits, and increasing profits by sound buying.

Ice and Frost—Booklet No. 176-B published by the Frick Company, Waynesboro, Pa., describes and illustrates Simplex Ice Scoring Machine and Vendors. Photographs and diagrammatic drawings are used.

Pneumatic Type Wrapping Machine—In an illustrated leaflet, the Pneumatic Scale Corporation, Ltd., Norfolk Downs, Mass. shows its pneumatic wrapping machines and lists many uses for these machines as well as some of the users.

Magnetic Contactor — By photographs and leaflet release Cutler-Hammer, Inc., 106 12th St., Milwaukee, Wis., announces its new magnetic contactor used on a.c. motor control.

Ammonia Ice Cream Freezers—Bulletin No. 30154, prepared by the York Ice Machinery Corporation, York, Pa., devotes 20 pages to illustrating and describing ice cream freezers equipped with York ammonia float control.

Skim Milk Powder—In a series of leaflets and bound booklets, the American Dry Milk Institute, 160 North La Salle St., Chicago, Ill., gives formulas for the use of dry skim milk in bakery products and calls attention to the characteristics of skim milk powder which encourages its use in the preparation of quality products.

NEWS OF THE MONTH

Bacteriologists Discuss Food Preservation

INCREASED interest of food manufacturers in bacteriology was shown by the greater attendance of industrial bacteriologists at the annual meeting of the Society of American Bacteriologists, held in Boston, Mass., Dec. 28-30. The Agricultural and Industrial Bacteriology Section devoted approximately one-half of its program to subjects of interest to producers of foods, and chose Dr. E. J. Cameron, of the National Canners' Association research laboratories, to be chairman of the section for the coming year.

"Observations on the Bacteriology of Slimy Beef," a paper by Prescott, Hale, and White, indicated that the slimy coating developing on beef in coolers was due to a nearly pure culture of a bacterium that grows easily at temperatures only slightly above the freezing point, especially in high humidity and stagnant air.

"Time-Temperature-Humidity Relations in Dried Fruit Pasteurization" as applied to dates was reported by J. A. Clague and C. R. Fellers. Their aim was to determine conditions which would produce dates that were safe from the public health standpoint, while leaving the treated product in a satisfactory condition. To be sure that the fruit was rendered safe, the samples were inoculated with *B. coli*, and final tests were made by inoculation with tuberculosis bacteria. The following minimal processes were determined with *B. coli* as the test organism.

Temperature (Deg. F.)	Time (Minutes)	Relative Humidity, (Per Cent)
190	20	82
179	30	78
170	40	72
160	60	71
165	60	100
145	No effective pasteurizing time under 80 minutes	

When infected artificially with the organisms causing tuberculosis the packaged dates were effectively pasteurized at all temperatures exceeding 170 deg. F. at 78 per cent relative humidity for 50 minutes.

The source of ropey milk organisms was traced largely to animal feeds by C. N. Stark and M. J. Foter. Variations in bacterial counts in milk control laboratories was described by F. L. Schacht and A. H. Robertson, who found inexcusable personal errors or variations by the same person counting the same plates. The variations ran from 0 to 25 per cent, but they believe variations should not exceed 5 per cent.

COMING EVENTS

FEBRUARY

10-11—American Honey Producers' League, Toronto, Ont.
12—National Cheese Producers' Federation, Plymouth, Wis.
12—National Malt Products Manufacturers' Association, Chicago, Ill.
26-28—Canners' League of California, Del Monte Hotel, Del Monte, Calif.

MARCH

—Dairy Products Association of the Northwest, St. Paul, Minn.
16-19—American Society of Bakery Engineers, Edgewater Beach Hotel, Chicago, Ill.
18—United States Beet Sugar Association, Washington, D. C.
30—April 3, American Chemical Society, Indianapolis, Ind.

Frozen Foods Group Meets at Atlanta

FORMATION of a skeleton executive council to govern present activities of the newly organized Frozen Foods Association of America was announced at an organization meeting of those interested in frozen foods held in Atlanta, Ga., Jan. 17. This was a preliminary step toward ultimate selection of the most representative men in the industry to direct operations for one year, these men to be chosen with reference to geographical distribution as well as to individual ability, according to stipulations laid down in the newly promulgated constitution of the association.

Members of the present council are empowered to name seven additional vice-presidents and eight directors who, together with themselves, will form the first executive council.

It was agreed to assure the American Institute of Refrigeration that the association would co-operate in all matters of mutual interest and that the executive committee of the Frozen Foods Association be directed to accept any overtures for an affiliation with the institute through a group association membership.

The following men were nominated to the executive council: H. P. Stuckey, director of the Georgia Experiment Station, president; A. W. Luhrs, chief engineer, Paperboard Industries Association, vice-president; W. T. Comer, Crystal Carbonic Company, vice-president; W. R. Tucker, who will represent Georgia peach-freezing interests and the railroads, vice-president.

Nominations for ten of the eighteen directors included: Prof. J. G. Woodruff, Georgia Experiment Station; E. L. Rhoades, associate professor of marketing, University of Chicago; O. O. Mills, general superintendent of the Fruit Growers' Express; A. D. Jones, Georgia Department of Agriculture; Dr. E. G. Ballenger, Polar Products, Inc.; C. P. Goree, Jr., assistant sales manager of the Frick Company; Clark Howell, Jr., business manager of the Atlanta *Constitution;* R. G. Gheeslin, Armour & Company; R. D. Ballentyne, United Cork Company; C. C. Street, manager, Frozen Foods, Inc.; Fred A. Woleben, and W. H. Caldwell, Georgia Ice Manufacturers' Association. C. T. Baker, refrigerating engineer, of Atlanta, was named secretary-treasurer.

Argument on Borax Patent Heard by Supreme Court

ARGUMENT as to the validity of a patent covering the use of a borax solution in the preservation of fresh fruit was heard by the U. S. Supreme Court on Jan. 12. Upheld by a district court and a circuit court of appeals, Patent No. 1,529,461, issued to Ernest M. Brogden and Miles L. Trowbridge and assigned to the Brogdex Company, is challenged by the American Fruit Growers, Inc. Because granting of the patent might seriously affect the citrus fruit industry, counsel for a number of states producing citrus fruits have filed briefs opposing validity of the patent.

Counsel for the American Fruit Growers contended at the hearing that the patent was "completely anticipated by prior art" and the accepted custom of many packers of fruits and vegetables. Charles Neave, for the patent owner, claimed that the patent was a real invention and had solved a problem of decay in a way formerly thought to be impossible. The strength and temperature of the solution and the duration of dipping were "perfectly new," he maintained, and the fact that the Department of Agriculture had conducted experiments to determine the value of the method showed that it was not the ordinary procedure.

According to the motion filed by counsel for interested states asking the right to be considered in the matter, "validation of the patent would be to place in the hands of these later patentees the power to exact an unjust tribute, over an additional period of 17 years, from an important and basic industry of this country; a tribute that would be onerous alike to the extensive citrus fruit industry and to the American public."

Conferences on the West Coast Treat Packing and Distributing Problems

THAT cannery operations on most products are pretty well standardized, and that the time has come to place the emphasis on improved methods of distribution, seemed to be the keynote of the Seventeenth Northwest Canners' Association convention, held Jan. 5-8 at Portland, Ore. This opinion was voiced by the 1930 president of the association, C. D. Minton, and by C. E. Hume, president of the National Canners' Association, in an address given at the annual banquet of the association on the evening of Jan. 8. Mr. Hume declared that underfinancing, with the canner's banker acting as his salesmanager, was the bane of the business today, and asked that the canners pack in 1931 only the quantity that they could finance without straining their resources.

Dr. J. R. Esty, of the Western Branch laboratory of the N.C.A., at San Francisco, presented some of the 1930 developments in canning technology. He stressed the necessity of controls in experimental packs, if results were to be interpreted correctly.

J. P. Stewart, of the California-Hawaiian Sugar Refinery Corporation, gave a short talk on liquid sugar, in which he pointed out the advantages and disadvantages of this material, and told what precautions should be taken in storing it and using it.

Officers for the year 1931 are: president, C. D. Farquhar, Washington Berry Growers' Packing Corporation, Sumner, Wash.; vice-presidents, George B. Kile and Mark Ewald; secretary, E. M. Burns.

Coincident with the Northwest Canners' Association meeting at Portland, Ore., the Northwest Fruit Barrelers' Association held a meeting on Jan. 5. The barrelers were addressed by Dr. Milton H. Nelson, of the department of economics at Oregon State College, who summarized the status of the small fruit crops of Oregon and Washington and showed the trends of production of fresh, canned, and frozen fruit. Most of the small fruits, particularly strawberries, are still on the upward trend in the Northwest. Loganberries are on the decline. Better than 80 per cent of the frozen berries are produced in the Northwest. H. C. Diehl, of the Wenatchee (Wash.) Department of Agriculture laboratory, gave a brief account of the frozen pack experiments of 1930 and pointed out that variety and maturity must be more emphasized in future experimental packs of frozen fruits, as well as better methods of freezing, though not necessarily quick-freezing.

Officers for 1931 elected at the meeting are: president, B. E. Maling, Hillsboro, Ore.; vice-president, O. E. Shay, Puyallup, Wash.; secretary-treasurer, E. M. Burns, Portland, Ore.

Freezing of fruits and vegetables occupied the major part of the program of the Fruit Products Conference held at the University of California on Jan. 9. F. W. Bireley, of the F. W. Bireley Company, Los Angeles, gave an account of his company's experience in freezing orange juice. Freezing has the disadvantage that it increases cost of the juice about 8c. a gallon to freeze, 6c. a gallon for cans, and 1c. a gallon a month for freezing storage. Shipping of frozen juice has been carried on to considerable extent, 31 cars of frozen juice being shipped from southern California in 1930. This represents about 217,000 gal. of juice, equivalent to about 72,000 boxes of oranges.

W. R. Baker, of the California Fruit Juice Company, San Francisco, read a paper on "Orange Juice and the Dairy Industry," in which he showed how the distribution of frozen juice might be a source of profit to the retail milk dealer. F. J. Hibbs, of the Gay Engineering Corporation, Los Angeles, in a paper on "Experience in Establishing Freezing Storage Plants," pointed out some of the things to be considered in freezing by refrigerated air.

D. W. Pentzer, of the Plant Industry laboratory of the U. S. Department of Agriculture at Fresno, reported the progress that has been made in the freezing storage of figs. Black Mission figs seem to give the best results, though sliced Adriatics or Calimyrnas were quite satisfactory. E. M. Mrak discussed the utilization of prunes in the form of pulp, canned ready-to-serve, canned fresh prunes and canned juice. The conference closed with a discussion by W. V. Cruess, of the University of California, on "Suggestions for Utilization of Surplus Fruits."

A display of frozen fruits and vegetables was a part of the conference. These included peaches, apricots, berries, and persimmons; and beans, spinach, corn in the husk, asparagus, and a number of other fruit and vegetable products.

Advertising Firms Set Up Experimental Kitchens

TWO advertising agencies, Batten, Barton, Durstine & Osborn, in New York, and the Gardner Advertising Company, in St. Louis, Mo., have recently established experimental kitchens for testing and developing new uses for the products of their clients. Although one use of the kitchens, which will be directed by experienced dietitians, will be experimentation with kitchen equipment of various kinds, the major purpose will be for development of recipes and new uses for food products, and discovery of the particular characteristics and ways of serving which have the greatest consumer appeal.

Recognizing the fact that "how-to-serve" label and advertising suggestions are one of the most potent appeals for food products, the agencies intend to assure themselves that such suggestions are simple, authentic, and within the claims made for the product. Copywriters are given opportunity to sample for themselves the dishes they intend to write about. Photographic equipment permits illustrations of the products as prepared for the table to be taken on the spot. In connection with the kitchen of the Gardner organization, a model dining room, in which foods can be served for comparison with rival products, or to contrast various recipes, has been installed.

The Batten, Barton, Durstine & Osborn kitchen is under the direction of Edith M. Barber. Thelma Reinke heads the staff in the Gardner Advertising Company cookery laboratory.

Decline in Food Prices Continues

IN SPITE of some recovery in general business conditions, as indicated by *The Business Week* index, food prices continued to decline during the month of December.

Since the middle of December, *The Business Week* index has advanced from 76 per cent of normal, as reported in the January issue of FOOD INDUSTRIES, to 80 per cent as we go to press. During the month of December wholesale prices of food decreased 4.55 per cent in comparison with a 2½ per cent average decline for all commodities. This is a 1.3 per cent greater decline for food than during the month of November and makes a total of 17 per cent for the year, against a total of 16¾ per cent for all commodities.

Retail prices of food had an average decrease of 3 per cent during December, as compared with 2 per cent during November; a reported total of 13 per cent for the twelve-month period.

Employment and payroll comparisons, however, favor the food industries. The general index of all manufacturing industries shows a 1.83 per cent decrease in employee personnel for December and an 18.28 per cent decrease for the year; a decrease of 1.32 per cent in payroll evaluation for December and 26.74 per cent for the year. The food industries' decrease in employee personnel was 1.28 per cent for December; 8.17 per cent for the twelve-month. The December decrease of 1.7 per cent in payroll evaluation brings the twelve-month decrease to 10.11 per cent.

Filtered Ultra-Violet Rays Have New Food Uses

THE quantum theory and mathematical physics, made famous in recent years by Einstein, Eddington, Millikan, and others, now enter the food field through the recently announced discoveries of Prof. George Sperti, of the University of Cincinnati. Working as director of the basic science laboratory, a branch of the university that was conceived by Dr. Herman Schneider, its president, Professor Sperti has pursued his investigations of the effect of radiant energy in biology and biological chemistry to the point where his discoveries have become the basis for the formation of General Development Laboratories, Inc. — an incorporated alliance between the University of Cincinnati and General Foods Corporation.

Sterilization of liquids, inactivation of enzymes, activation of ergosterol to Vitamin D potencies hitherto unknown in other irradiation methods, are said to result from researches of Professor Sperti.

Selective irradiation is the briefest descriptive term that may be applied to Mr. Sperti's work. The quantum theory postulates that there must be a threshold energy value for any change that can be brought about in matter. Testing the hypothesis by ultra-violet rays filtered carefully so that only waves of definite length were employed, he found that certain very critical wave lengths existed. One of these is at about 2,960 Angstrom units, a point at which bacteria are suddenly killed. At longer wave lengths they are uninjured by irradiation, but anything shorter destroys them, Mr. Sperti's work indicates.

Other critical wave lengths exist for ozone formation, for enzyme inactivation, conversion of ergosterol to Vitamin D, and for many other less understood chemical changes. The wave lengths of irradiant energy employed have a range including all the wave lengths of ultra-violet rays, down through Grentz rays, or soft X-rays, and perhaps others even shorter.

Ultra-violet irradiation of milk has heretofore proved wholly inadequate for conferring upon it a Vitamin D potency, because full irradiation has always ruined the flavor, rendering it unpalatable. By selective ultra-violet irradiation it is now possible to give milk a Vitamin D potency without injuring the flavor, according to the reports.

Preservation of orange juice has been a difficult problem, even for those attempting to utilize quick-freezing, on account of terpene formation and enzymatic changes. However, by the new method, laboratory tests have demonstrated the possibility of a wholly new technic. Pasteurization of orange juice by the usual method has previously been unsatisfactory, because heating to temperatures high enough to destroy enzymes ruins the flavor; and if only bacteria were destroyed, the enzymes remained to spoil the flavor in other ways. The new knowledge indicates that the juice should be first irradiated to inactivate the enzymes by whatever specific wave lengths are necessary. Then it should be bottled and next pasteurized at temperatures which will sterilize but which are low enough to avoid flavor changes.

Many other applications for selective irradiation suggest themselves, including applications to dairying, cheese making, baking, and medical therapy. President Schneider regards the subject as a new science. The discovery is covered by U. S. Patent No. 1,767,579, issued July 10, 1928.

The new arrangement between the university and General Foods includes the erection at the university of a laboratory especially designed to carry forward more intensively the research work which led to the discoveries now being developed for commercial application.

Officers of the General Development Laboratories, Inc., are: Ralph G. Coburn, executive vice-president of General Foods Corporation, president; Lewis W. Waters, vice-president in charge of development of General Foods, vice-president; John S. Prescott, vice-president of General Foods, secretary. These officers, with President Herman Schneider and Professor Sperti, representing the scientific interests of the university, constitute the board of directors. L. A. Zahrn, treasurer of General Foods, is treasurer of the new corporation.

More Packing Houses Planned For Alaskan Reindeer

A COMMITTEE was recently appointed by Secretary of the Interior Wilbur to investigate the problems that have arisen out of the rapid increase of reindeer herds in Alaska. At the present time, there are about 1,000,000 reindeer along the west coast of Alaska, and they breed so rapidly and dependably that 300,000 a year may be slaughtered without depleting the herds.

Some tens of thousands of reindeer carcasses are now being shipped to the United States every summer, chiefly from the Seward Peninsula. It is held, however, that the proper method for utilizing this store of reindeer meat is not by shipping it out as slaughtered, but should be based upon the establishment of special packing houses in Alaska. Corned meat, canned meat, smoked meat, sausage meat, and package meat put up in accordance with recently developed methods of quick-freezing are believed to present the most advantageous means.

A survey of the Alaskan situation from the standpoint of developing plants to take care of reindeer meat indicates that one large plant at Cantwell, on the Alaskan Railroad, capable of handling 300,000 carcasses a year, should be established, and that possibly a half dozen smaller plants at different points along the coast should be set up. The possibilities of establishing these plants is being discussed by the department with important people in the meat-packing industry.

Five cold-storage plants now maintained by Lomen Brothers Reindeer Company are, in reality, warming plants, because outside temperatures during the slaughter season are as low as 40 deg. F. below zero.

Foundation for Food Study Set Up by Kroger Company

ESTABLISHMENT of the Kroger Food Foundation, a research organization which will work to assure better foods to the public by study of methods of preparation and distribution, has been announced by the Kroger Grocery & Baking Company. A fund of $1,000,000 has been set aside to maintain the foundation.

The work of the foundation "will involve research, testing, and analyzing every variety of food product from its source to the table," according to Albert H. Morrill, president of the Kroger organization. A seal of approval will be granted to those products which meet the standards required by the new body.

There will be no connection between the scientific activities of the foundation and the operations of the Kroger Grocery & Baking Company, it is pointed out. The director of the foundation has not yet been announced.

Reindeer provide transportation as well as product at this camp of the Lomen Brothers Reindeer Company. It has five cold-storage plants and a total herd of 250,000

Canners Discuss Merchandising Trends; Consider Food Law Changes

DISTRIBUTION, including the application of the McNary-Mapes amendment to the food law administration, was the keynote of the 24th annual convention of the National Canners' Association, held in Chicago during the week of Jan. 19. Despite the economic conditions of the past year, attendance was approximately equal to that of previous years. As usual, the city of Chicago was the scene of many other conventions of related industries, such as the sauerkraut packers, pickle packers, preservers, mayonnaise manufacturers, syrup manufacturers, and the distribution groups—wholesale grocers, retail and chain store grocers, and food brokers.

The informal conferences on technical problems of the canning industry that were inaugurated in 1930 were an important feature of the convention. The number of these afternoon conferences was increased to three by organization of the home economics conference, in addition to those on canning problems and raw products problems.

Officers of the National Canners' Association elected for the coming year are: Francis A. Harding, of William Underwood Company, Watertown, Mass., president; M. C. Hutchinson, of Michigan Fruit Canners, Inc., Fennville, Mich., first vice-president; Leonard E. Wood, of California Packing Corporation, second vice-president; Frank E. Gorrell, Washington, D. C., secretary. Mr. Gorrell has been secretary of the association continuously for the 24 years since the association was founded.

Machinery on display in the exhibition hall showed further development of continuous automatic machinery, including equipment for continuous manufacture of tomato juice and for apple sauce. New machines for separation of tough and tender peas by means of specific gravity were displayed, as well as several new types of closing machines for glass jars, including one for automatically sterilizing caps and applying them in a sterile atmosphere of steam. Noteworthy was the display of paper containers for the first time at a canners' convention.

Although many expected to hear the recent corn-sugar ruling openly discussed, it was not brought out on to the convention floor. At the meeting of the conference committee representing the canners, wholesalers, and brokers, the resolution shown elsewhere on this page was passed calling upon the Secretary of Agriculture for a reconsideration of his ruling. The resolution was then referred back to the respective associations for action, with the result that the canners' association approved it without reservation.

James A. Farrell, president of the United States Steel Corporation, gave an able analysis of the business situation, in which he took issue with the deflationist policy recently enunciated by Albert H. Wiggin, of New York. Said Mr. Farrell: "It is my deliberate judgment that a general reduction of wages in this country, instead of relieving the situation, would set back the impending recovery by at least two years."

A careful review of the intent and proposed administration of the McNary-Mapes amendment to the Federal Food and Drugs Act was presented by Dr. Paul B. Dunbar, Assistant Chief, Food and Drug Administration.

One of the problems confronting the administration is that the amendment authorizes the Secretary to determine a reasonable standard of quality for each "class" of canned food, using the term class in its generic sense, and does not authorize minimum standard for grades, varieties, or species of the product. Thus the Secretary cannot make separate grade definitions for each species of salmon, however different they may be, nor for each of the many differing varieties of the different kinds of fruits.

Label designation of the substandard quality probably will carry a four-word qualifying phrase underneath the words "Below U. S. Standard," after the manner shown in January, 1931, FOOD INDUSTRIES, page 44. The exact wording of the qualifying phrase has yet to be determined. At each sectional meeting a representative of the Bureau discussed the application of the amendment to each class of food and showed how standards were defined.

The present overcapacity of the pea canning branch makes it imperative to do three things, according to Fred A. Stare, of the Columbus Food Corporation, Columbus, Wis. It must reduce acreage by at least 15 per cent; pack better peas and avoid production of any peas below standard quality; study the modern trend of merchandising; be financially prepared to market the peas in an orderly manner; and avoid dumping.

Distribution of canned peas is being influenced by the advent of smaller can sizes, in the opinion of Arthur Ehrenfeld, Francis H. Leggett & Company. Although he was warm in his praise for the 8-oz. tin, if filled with strictly fancy peas, putting any quality lower than fancy in 8-oz. cans is a serious mistake, he held.

Orderly marketing must be preceded by orderly manufacturing, declared Nathan Eckstein, president, Schwabacher Brothers & Company., Inc., Seattle, Wash. His definition of orderly marketing includes movement of all goods from producer to consumer via the wholesaler-retailer route, and deplores loading the trade with goods and then warehousing vast stocks in the same area where their very presence adds to merchandising uncertainties through the implied threat of forced selling.

In discussing constructive merchandising, O. Lockett, of Lockett & Moore, pointed out that fresh foods and frozen foods are a serious threat to the canners' market, and that the way to meet the situation is by modern merchandising.

Advertising will help Mr. Lockett said, but he asked his hearers to distinguish between advertising *per se* and a constructive merchandising campaign in which advertising is an integral part.

Effect of frozen fruits on the sale of canned fruits was the subject of detailed analysis by Robert J. Roulston, vice-president of Durand-McNeil-Horner Company. Many of the replies to his questionnaire indicated that fresh fruit rather than canned fruit probably would be the loser in the newer competition. His own opinion was that the future of frozen fruits will be a debatable question for a long time to come.

Sale of large and bulk packages of frozen fruits has gone well in the hotel, restaurant, and baking trade, particu-

Joint Corn Sugar Resolution

The Secretary of Agriculture by administrative ruling has reversed the long-established policy of the Department of Agriculture requiring that the presence of corn sugar in prepared food products be declared on the label.

This reversal of an established ruling, far from representing the wishes of state food officials, industries engaged in the production of prepared foods, trades engaged in their distribution, and consumers who rely on the Food and Drugs Act to safeguard their interests, was actively opposed by them.

It accomplished by administrative action what the Congress of the United States has refused, despite repeated efforts by corn-sugar proponents, to enact into law. It disturbs the relations of federal and state food laws and regulations. It deprives the consumer of information to which he is entitled and sets a precedent for analogous rulings affecting other products, thus paving the way to defeating the purpose for which the pure food laws were enacted.

Therefore this joint conference committee of representatives of the National Wholesale Grocers' Association, American Wholesale Grocers' Association, National Food Brokers' Association, National Chain Store Association, and the National Canners' Association reaffirms its approval of the Food and Drugs Act and expresses its opposition to any action, legislative or administrative, which weakens that act or deprives the food consumer of information to which he is justly entitled.

We respectfully request the Secretary of Agriculture to reconsider this subject, which is vital to the public and the food trade.

We direct that a copy of this resolution be sent to the President of the United States, to Secretary Hyde, and to the secretary of the Dairy, Food and Drug Officials' Association.

larly of berries and cherries, but the retail outlet with its greater volume possibilities has yet to be won. Large metropolitan populations in the Northeast offer the most likely possibility for frozen fruits, the questionnaire revealed.

Among the technical papers presented at section meetings was "Production and Standardization of Tomato Juice," by R. H. Winters, of the American Can Company, in which was stressed the paramount importance of strictly fresh raw material of proper maturity for producing a high-quality tomato juice. Likewise, he insisted upon proper trimming, regulated temperatures, absence of aeration, and corrosion-proof equipment as indispensable conditions. In view of the wide-spread interest in this subject it is hoped that his complete paper can be published in an early issue of FOOD INDUSTRIES.

Reduction of production, or else increased quality of tomato products, was urged by Victor H. Hanf, of Seeman Brothers, Inc., as a means of converting a non-profit item into a profitable one. The 7,000,000-case surplus from 1930 is rendering the market very unstable, he pointed out.

"Standardization of canned foods, to be permanent, must begin with the grower and not after delivery of the raw product to the receiving platforms of the cannery," W. C. Gleagley, state analyst of the Michigan Department of Agriculture, pointed out at the Fruit Section. As an illustration of the benefit to be gained by co-operative effort of the growers, the packers, and regulatory officials, Mr. Gleagley described a method used to put down an invasion of the cherry fruit fly.

The problem of spray residue on fruit and vegetables is also now actively engaging the attention of control officials, Mr. Gleagley pointed out. In those sections where spray removal programs have been carried out, he said, it is pertinent to point out that the result has been, in addition to the elimination of a dangerous condition, the development of better practices in the packing of a higher grade article than would otherwise have been possible. Statements are repeatedly made that those who have resorted to removal of spray residue in the handling of fresh fruits would not go back to the old order of things even though there ceased to be a spray residue problem, solely because of the decided improvement in quality of the product.

"The time is near," he said, "when the fresh fruit market should be compelled to follow the same requirements that are expected of the canner. The washing, sorting, and elimination of decomposed and unfit raw material is a problem which is applicable both to the raw fruit producer and the canner."

Progress in the simplification and standardization of containers for canned meats was outlined by C. R. Moulton, Institute of American Meat Packers, before the Meat Section. A survey revealed that 75 different sizes of cans were in use, varying from 2½x1 5/16 in. to 7x5¾ in. for round cans and including four sizes of oblong cans and four sizes of tapered cans. Some of these cans differed by only 1/16 in. in height or 3/32 in. in diameter. "There can be no doubt," said Mr. Moulton, "that there is no real justification for all the variations in size which are found to exist." It was also found that if all the varieties of kinds, sizes, and net contents of canned meat which are offered for sale were listed, there would be a total of 408 different items. "I venture to suggest," he said, "that there is much economic waste in all this variety of size and content as well as, perhaps, some deception, however unintentional.

DuBois

FRANCIS A. HARDING
of Wm. Underwood Company, Watertown, Mass., New President of the National Canners' Association

Canned Foods to Be Sold By Swift & Company

PLANS for marketing a complete line of canned fruits and vegetables under the Swift brands were announced by G. F. Swift, president of Swift & Company, on Jan. 26. This is the first indication from any of the four large packers of action based on the recent modification of the packers' consent decree. According to Mr. Swift, these stocks will be distributed to retail dealers through existing branch offices and over existing car routes by the company's present force of salesmen. "It is a matter of gratification to the company," he said, "that we will be able to use our existing facilities for the distribution, at wholesale, of a more complete line of food products. The fact that a salesman can sell a complete line rather than merely a line of meats means that savings can be effected on distributive costs." A definite date for the introduction of these items has not yet been announced.

Rumors that Swift & Company were to distribute goods under labels of Libby, McNeill & Libby were declared false by Edward C. McDougall, president of that organization. Mr. McDougall's statement as issued to Libby representatives throughout the country, says:

"To set at rest rumors that are being circulated to the effect that Swift & Company are soon to distribute our brand of products formerly prohibited by the consent decree, please notify your salesmen and the trade that we shall continue to distribute both Libby brands and Libby controlled brands of such products through the present channels and not through Swift & Company. Should Swift & Company decide to handle such products, we will not permit the use of Libby brands or Libby controlled brands."

Colored Margarine Opposed At Hearings

HEARINGS on margarine bills before the House Committee on Agriculture on Jan. 21 to 24 brought forth heated testimony on the part of dairy interests against the recent ruling by Commissioner of Internal Revenue David Burnet that margarine in which the color is due to palm oils is exempt from the 10 cents per pound tax for artificial color. One of the bills under consideration redefines yellow coloring to include this product, and the other bills seek to prevent purchase of any margarine for government institutions.

Twenty states were represented at a meeting held on Jan. 7 to organize opposition to the ruling. It is asserted by House members that a loss of $500,000 a day to the dairy industry is being caused by the decision. The ruling, according to A. M. Loomis, secretary of the National Dairy Union, "opens the door to an unlimited quantity of oleomargarine just as yellow as butter. A dozen great oleomargarine firms have already entered this yellow oleomargarine field. It is likely that every manufacturer in the United States will begin to flood the market with yellow oleomargarine."

A defense of the palm oil margarine was presented by William F. Steele, head of the Institute of Margarine Manufacturers. He said that no unfair methods were used by the industry in selling its product as each package is marked "oleomargarine" in black letters ¼ in. in height.

Oleomargarine in which palm oil has been used as an ingredient cannot be considered as being artificially colored, Mr. Steele declared, when of the total products going into the manufacture of oleomargarine, palm oil constitutes from 10 to 15 per cent. He admitted that palm oil is used for coloration, but added it is nutritious and adds value to the finished product.

Mr. Steele denied that consumption of oleomargarine had increased since the ruling went into effect. Evidence has been introduced in the hearings by the proponents of the measure that one firm has advertised that 1,000,000 new customers have been secured.

Breads, Tomato Juice, And Syrup Defined

THE Food Standards Committee, consisting of representatives of the Association of Official Agricultural Chemists, the Association of Dairy, Food and Drug Officials, and of the U. S. Department of Agriculture, has proposed definitions for two products hitherto not defined, whole-wheat bread and tomato juice, and has suggested a revised and amended definition for sorghum syrup, W. S. Frisbie, of the Federal Food and Drug Administration, and chairman of the committee, announced on Jan. 8. The committee also has proposed revisions of the existing definitions for white bread, milk bread, raisin bread, rye bread, and Boston brown bread, but the revisions involve no material changes except in the definitions for milk bread and Boston brown bread, Mr. Frisbie states.

The committee invites criticisms and suggestions from food officials, the trade, consumers, and all others interested, regarding the proposed definitions. Communications should be addressed to A. S. Mitchell, secretary, Food Standards Committee, Food and Drug Administration, Washington, D. C., and should reach him not later than March 31, 1931.

The proposed definitions follow:

WHITE BREAD is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of flour, potable water, edible fat or oil, sugar and/or other fermentable carbohydrate substance, salt, and yeast; with or without the addition of milk or a milk product, of diastatic and/or proteolytic ferments, and of such limited amounts of unobjectionable salts as serve solely as yeast nutrients. The flour ingredient may include not more than 3 per cent of other edible farinaceous substance. White bread contains, one hour or more after baking, not more than 38 per cent of moisture. The name "bread" unqualified is commonly understood to mean white bread.

WHOLE-WHEAT BREAD, ENTIRE WHEAT BREAD, GRAHAM BREAD is the product in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of whole-wheat flour, potable water, edible fat or oil, sugar and/or other fermentable carbohydrate substance, salt, and yeast; with or without the addition of milk or a milk product, of diastatic and/or proteolytic ferments, and of such limited amounts of unobjectionable salts as serve solely as yeast nutrients. It contains, one hour or more after baking, not more than 38 per cent of moisture.

MILK BREAD is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of flour, milk or its equivalent, edible fat or oil, sugar and/or other fermentable carbohydrate substance, salt, and yeast; with or without the addition of diastatic and/or proteolytic ferments, and of such limited amounts of unobjectionable salts as serve solely as yeast nutrients. The flour ingredient may include not more than 3 per cent of other edible farinaceous substance. The milk may be replaced in whole or in part by its equivalent in whole-milk solids and potable water in the proportions normal to milk. Milk bread contains, one hour or more after baking, not more than 38 per cent of moisture.

RAISIN BREAD is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of flour, potable water, edible fat or oil, sugar and/or other fermentable carbohydrate substance, salt, and yeast; with the addition of raisins, with or without the addition of milk or a milk product, of diastatic and/or proteolytic ferments, and of such limited amounts of unobjectionable salts as serve solely as yeast nutrients. The flour ingredient may include not more than 3 per cent of other edible farinaceous substance. The finished product contains not less than 3 ounces of raisins to the pound.

RYE BREAD is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of rye flour, or of rye flour and wheat flour, with potable water, edible fat or oil, sugar and/or other fermentable carbohydrate substance, salt, and yeast; with or without the addition of milk or a milk product, of diastatic and/or proteolytic ferments, and of such limited amounts of unobjectionable salts as serve solely as yeast nutrients. The total flour ingredient, of which rye flour constitutes not less than one-third, may include not more than 3 per cent of other edible farinaceous substance. Rye bread contains, one hour or more after baking, not more than 38 per cent of moisture.

BOSTON BROWN BREAD is the product, commonly in the form of cylindrical loaves, obtained by steaming or baking a leavened mixture of rye flour or meal, corn meal, and a wheat flour, with molasses, salt, milk, or a milk product, with or without potable water and with or without raisins. Leavening is commonly effected through the use of baking powder, or of sodium bicarbonate and sour milk.

TOMATO JUICE is the clean, sound product consisting of the juice and pulp of raw or cooked ripe tomatoes from which the skins, seeds, and cores have been removed.

SORGHUM SYRUP is the syrup obtained by the clarification and concentration of the juice of the sugar sorghum and contains not more than 30 per cent of water, nor more than 6.25 per cent of ash calculated on a dry basis.

Morrow Faction Triumphs in Ward Baking Conflict

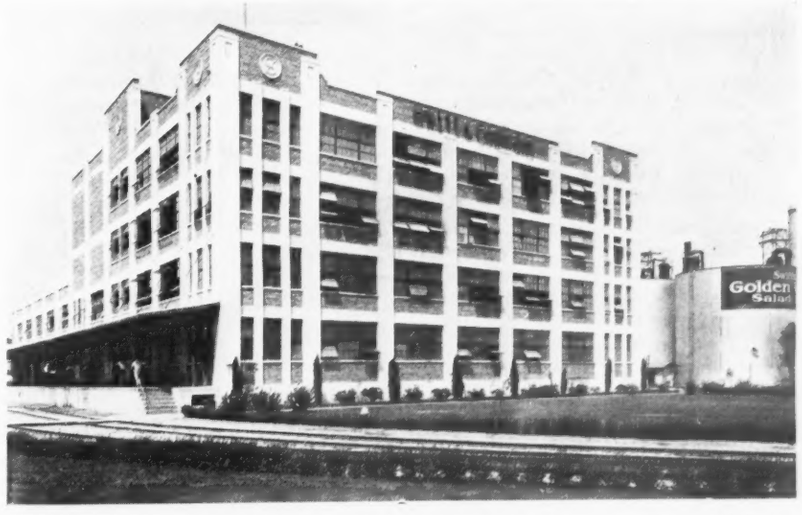
THE struggle for executive control of the Ward Baking Company between the management headed by William C. Evans and Ralph S. Kent and a group of stockholders who desired to put the operation of the company in the hands of George K. Morrow, chairman of the board of Gold Dust Corporation, appeared on Jan. 28 to have resulted in victory for the latter group.

In a stockholders' meeting held on Jan. 26 at the call of the faction desiring the change, tabulation of proxies indicated that a majority was represented, thus giving legal status to moves for replacement of directors and officers. In the early morning hours of Jan. 28, after a strenuous all-night session of stockholders, resolutions were carried removing Mr. Evans from the chairmanship and Mr. Kent from the presidency. Other directors removed were: Howard B. Ward, Howard K. Walter, John L. Kirkland, W. J. Jackson, Hamilton F. Andrews, John M. Barbour, J. W. Tolley, Leroy W. Baldwin, William H. Williams, Wade Holland, and Arthur D. Goodnow.

Only two of the old directors were retained. They are C. B. Comstock and E. W. Gwinner, leaders in the opposition faction. New directors elected are: Edgar Palmer, Charles Hayden, George K. Morrow, Robert W. Jameson, Randolph Catlin, L. B. Halderman, P. McK. Sturgis, George W. Davis, E. H. Stetson, W. L. Cummings, Walter Schlaire, and T. H. McInnerney.

A suit asking an injunction to prevent the meeting was sought by the old management several days before it took place, but the petition was dismissed. Another suit asking an accounting for more than $1,000,000 of the company's money alleged to have been used by the former management to purchase outstanding stock was pending on Jan. 28.

New Shortening Plant of Swift & Company



"Parfay" a new blended shortening being marketed in the West by Swift & Company, is manufactured in this new $2,000,000 plant at Los Angeles, Calif. It will turn out 2,000,000 packages a year

TRADE NOTES

AMERICAN CAN COMPANY has been refused a review by the U. S. Supreme Court of the Clayton Act case brought against it which was decided in favor of the Ladoga Canning Company. A circuit court of appeals ruled that price discriminations of the can company in favor of the Van Camp Packing Company resulted in lessening competition in the packing industry and it approved a treble damage judgment of $90,000 in favor of the Ladoga concern.

BORDEN'S, LTD., a holding company to own all Canadian operating subsidiaries of the Borden Company, has been organized in Montreal, Quebec. The Canadian companies constituting the new organization had total sales for 1930 in excess of $28,000,000, it is said.

P. BURNS & COMPANY, meat packers of Calgary, Alberta, Canada, are planning to open a factory for the manufacture of chicken, meat, and vegetable soups.

DURKEE FAMOUS FOODS, INC., which operates a vegetable oil refinery and oleomargarine plant at Berkeley, Calif., has asked for an injunction restraining the California Department of Agriculture from enforcing the state law prohibiting coloring of oleomargarine. Oleomargarine in which the yellow color is due to the presence of palm oil has recently been ruled to be exempt from the federal tax of 10 cents a pound for artificially colored butter substitutes. The California law, however, specifically prohibits coloring, "by whatever means the coloring is accomplished."

GENERAL BAKING CORPORATION has proposed to stockholders a reorganization plan which will dissolve the holding corporation and liquidate the $6 cumulative preferred stock. The holding corporation was formed in 1925 to acquire several baking companies, including the General Baking Company, the Continental Baking Company, and the Ward Baking Company. The deal with the General Baking Company was the only one effected, however.

GENERAL FOODS CORPORATION has announced that a new factory for the manufacture of "Jell-O" will be opened in conjunction with the Maxwell House coffee plant in Los Angeles, Calif. Machinery is now being installed and it is expected that the factory will be in active operation next month.

INDIANAPOLIS ABATTOIR CORPORATION, Indianapolis, Ind., is planning expansion of its "Sally Lee" quick-frozen meat to include a second grade, it was announced on Jan. 16. Prices on the new grade range about 25 per cent lower than those for the higher one.

MORTON SALT COMPANY, Chicago, Ill., has purchased the Manistee salt plant of the Ruggles & Rademaker Company. The Morton company assumed charge of the plant on Jan. 1.

NATIONAL BISCUIT COMPANY has completed plans for the acquisition of Wheatsworth, Inc., and the plans have been approved by the directors of the latter organization.

PAGE & SHAW, Inc., equipment and assets have been purchased by Fred L. Daggett, head of the Daggett Chocolate Company and other candy firms in the Boston district. Manufacture of confectionery under the Page & Shaw label will be resumed under his control in the near future.

PROCTER & GAMBLE COMPANY recently acquired the coconut oil crushing mill of the Oil Seed Crushing Company in Baltimore, Md. The mill is said to be one of the largest and most complete in the country.

PERSONALS

W. F. BOHLMAN, superintendent of the Chicago plant of Libby, McNeill & Libby, and MAX M. GERTH, chief chemist at the same plant, sailed for Buenos Aires on Jan. 9 aboard the S. S. "American Legion." They will spend three months in South America inspecting manufacturing operations in Libby plants in that part of the world.

M. A. JOSLYN, of the Fruit Products Laboratory of the University of California, has been retained by the National Juice Company, of New York and Tampa, Fla., as a consultant in the manufacture of frozen orange juice. He has been granted a temporary leave of absence from the university. National Juice Company is a subsidiary of National Dairy Products Corporation.

T. GEORGE LEE has been elected president of Armour & Company to succeed the late F. Edson White. He was formerly vice-president in charge of the beef department and branch house sales. Mr. Lee's election was accompanied by other executive changes. PHILIP D. ARMOUR, first vice-president and a grandson of P. D. Armour, founder of the company, resigned as a director and officer. FRED REYNOLDS, formerly manager of purchasing in Chicago, was made a vice-president, and J. H. JOHNSTONE was elected assistant treasurer. The resignation of Mr. Armour severs the last executive connection between the Armour family and the company.

HARLEY B. LEWIS, sales representative for the Sun-Maid Raisin Growers' Association in New York and New England, has been made sales manager of the co-operative to succeed GLEN S. RIDNOUR, who recently resigned. Mr. Lewis has gone from New York City to Fresno to take up his duties in the new position.

R. G. LUCKS has been appointed general manager of the Oregon Packing Company, Portland, Ore., succeeding C. J. CLEAR, who was killed in an automobile accident late in 1930. Mr. Lucks also succeeded to Mr. Clear's position on the directorate of the Northwest Canners' Association.

HOWARD J. MOUNTREY, assistant to the vice-president in charge of sales of the Borden Company, has been made general sales manager of the Borden's Food Products Company, Inc.

JOHN P. SMITH, formerly director of production of DuPont Cellophane Company, will become vice-president and assistant general manager of Visking Corporation, Chicago, Ill., manufacturer of cellulose sausage casing, on March 1.

GUSTAVUS F. SWIFT has been elected president of Swift & Company, Chicago, Ill., succeeding Louis F. Swift, who becomes chairman of the board, it was announced on Jan. 9. Louis F. Swift had been president since 1903.

CARLYLE THORPE, president of the Sun-Maid Raisin Growers of Delaware, Fresno, Calif., resigned on Jan. 10. Mr. Thorpe, who is also general manager of the California Walnut Growers' Association, took the Sun-Maid post last spring, at the request of Charles C. Teague, of the Federal Farm Board, and agreed to remain president of the manufacturing organization of the co-operative until the 1929 crop had been moved.

Armour Head Dies

Blank & Stoller

F. EDSON WHITE, president of Armour & Company, and one of the outstanding figures in the meat-packing industry, was instantly killed on Jan. 15 as a result of a fall from a window of his seventh-floor apartment in Chicago, Ill. The fall was accidental. Mr. White was born in Peoria, Ill., in 1873, and entered the packing business with the firm of E. Godel & Sons of that city in 1890. He entered the Armour organization in 1895 as a car checker at $18 a week. Elected a vice-president in 1915, Mr. White stepped into active control in 1923, when he succeeded the late J. Ogden Armour as president.

PAUL S. WILLIS, vice-president and general manager of the Comet Rice Company, has been elected president of the New York Association of Manufacturers' Representatives.

EDWARD F. WILSON, son of Thomas E. Wilson, president of Wilson & Company, meat packers, has been elected a vice-president of the company, it was announced on Jan. 11. He has been with the company six years and is manager of the small stock division. Other new vice-presidents are H. J. Williams, W. J. Cawley, European manager; J. D. Tooney, Carl Fowler, R. F. Eagle, C. R. Hood, and W. S. Nicholson.

FRED A. WOLEBEN, manager of Tom Huston Frozen Foods, Inc., Columbus, Ga., recently resigned.

JOHN L. WOLFROM has resigned as superintendent of the Snider Packing Corporation plant at Fayetteville, N. Y., to become president of the newly organized Wolfrom Canning Machinery Company, Syracuse, N. Y.

OBITUARY

THOMAS BURKHARD, president of Thomas Burkhard, Inc., manufacturer of copper equipment for the candy and preserving trade, died recently at Freeport, L. I. He was 67 years of age.

MAURICE FIEUX, president of Runkel Brothers, Inc., New York City, chocolate and cocoa manufacturers, died on Jan. 10. He was 53 years of age and had been associated with the Runkel organization for 30 years. He was made president two years ago.

JAMES HARVEY GENUNG, war-time president of the Grain Export Corporation, died in Washington, D. C., on Jan. 6. He had also served as president of the American Corn Millers' Federation and the American Feed Manufacturers' Association, but had retired from active business four years ago.

ROBERT HENKEL, president of the Commercial Milling Company, Detroit, Mich., since 1895, died in Miami, Fla., a few weeks ago. He was 70 years of age and had been connected with the industry since he was seventeen.

MARION LESLIE, manager of the Columbus (Ohio) branch of the National Biscuit Company, died at his home in that city on Dec. 20.

WILLIAM JAMES LOWRIE, formerly manager of the Aguirre Sugar Company, of Porto Rico, died in Miami, Fla., on Jan. 1. Mr. Lowrie, who was 81 years old, formerly lived in Brooklyn, N. Y.

ALFRED W. MCCANN, author and radio lecturer, who had gained a wide following as an authority on foods, died suddenly in New York City on Jan. 19. Mr. McCann, who was 52 years of age, had been engaged in pure food crusading since the early days of the food and drug act. He had recently been connected with several food companies in an advisory capacity.

GEORGE C. SCHULDERBERG, aged 62, chairman of the board of the William Schulderberg & T. J. Kurdle Company, Baltimore (Md.) meat packers, died suddenly on Dec. 29.

JOHN ALBERT SEBERET, Cincinnati, Ohio, formerly head of a meat packing firm bearing his name, died in that city on Jan. 8 at the age of 97.

SIGEL W. SEEMAN, first vice-president of Seeman Brothers, New York City, food wholesalers who distribute large quantities of canned goods and other grocery products under their own "White Rose" label, died on Jan. 16 after a short illness. Mr. Seeman, who was 68, was well known to food packers throughout the country.

ROY SLOCUM, vice-president of the Coast Dakota Flour Company, San Francisco, Calif., died recently of heart disease. He was formerly president of the Russell Milling Company and a past president of the Flour Dealers' Association of San Francisco.

GEORGE SONNICH, founder and president of the Standard Nut Margarine Company, Indianapolis, Ind., died a few weeks ago at his home in that city. He came to this country from Denmark in 1906, and founded the margarine organization in 1919.

NEW CONSTRUCTION

Bakery — Brownel Realty Co., c/o Dugan Bros., 161 Arlington Ave., Newark, N. J., lessees, awarded contract for a 1 story, 50 x 100 ft. bakery at Arlington Ave. and 3rd St. to Robert Allen, Inc., 319 Mount Pleasant Ave., Newark. Estimated cost $40,000.

Bakery, etc.—J. T. Camlet, 26 Piaget Ave., Clifton, N. J., Archt., is receiving bids for a 2 story bakery, etc., to include baking ovens, mixing machines, etc., at Wallington Ave. and Mercer St., for J. Borbuta, 113 Halstead St., Wallington. Estimated cost $40,000.

Bakery Addition—Haller Baking Co., 204 North Denninston Ave., Pittsburgh, Pa., is having plans prepared for a 3 story addition to bakery. P. R. Scheuneman, Magee Bldg., Pittsburgh, is architect.

Bakery, Feed Grinding Mill and Ice Cream Mfg. Plant—Beach Milling Co., M. W. Beach, Mgr., Iroquois, Ont., plans the construction of a bakery, feed grinding mill and ice cream manufacturing plant. Estimated cost $60,000.

Bakery, Cold Storage Plant, Etc.—Dept. of Correction, Capitol, Albany, N. Y., will receive bids in February for the construction of a group of buildings including bakery, cold storage plant, new storehouse, etc. at New York State Reformatory for Women, Bedford Hills. Estimated cost to exceed $40,000.

Bakery, Ovens, etc. — H. Loczlo and H. Kronowitz, Wythe Ave. and 7th St., Brooklyn, N. Y., plan alterations to bakery and replacement of ovens, etc. Estimated cost $40,000, including equipment. S. Millman, 1780 Pitkin Ave., Brooklyn, is architect.

Food Products Plant—Christie Brown & Co., Ltd., 202 King St. E., Toronto, Ont., subsidiary of National Biscuit Co. of Canada, 139 Sterling Rd., Toronto, had plans prepared for a food products plant at Winnipeg, Man. Estimated cost to exceed $150,000.

Brewery — Associated Breweries of Canada, Calgary, Alta., has made an offer to British Columbia Government to construct a brewery in Vancouver, B.C. Estimated cost $500,000. Included in offer was a check for $250,000 as a guarantee.

Bottling Plant—Coca Cola Bottling Works, J. M. Wynns, Gen. Mgr., Lebanon, Tenn., awarded contract for a 2 story, 60 x 130 ft. bottling plant on East Main St., to T. N. King Co., 335 2nd Ave., S., Nashville, Tenn. Estimated cost $30,000.

Bottling Plant — Orange Crush Bottling Co. Ltd., 1098 Mainland St., Vancouver, B. C., awarded contract for the construction of a bottling plant between Alma Rd. and Dunbar St. Maturity Mar. 1.

Bottling Plant—Undina Beverage Co., B. A. Benson, V. Pres., Higganum, Conn., is receiving bids for a 2 story, 75 x 125 ft. bottling plant. Estimated cost $50,000. Private plans.

Candy Manufacturing Plant—William Neilson Ltd., 277 Gladstone Ave., Toronto, Ont., plans addition to candy and ice cream manufacturing plant. Estimated cost $150,000. Architect not selected.

Canning Plant — Dorgan-McPhillips Packing Co., A. J. Kessler, Ch. Engr., Columbia, Miss., awarded contract for an 80 x 250 ft. canning plant to Dye & Mullins, Columbia.

Canning Plant—Minnesota Valley Canning Co., LeSueur, Minn., plans the construction of building and equipment additions to present plant at LeSueur, also at Winthrop. Estimated total cost $400,000. R. W. Richardson, 116 East 4th St., St. Paul, is engineer.

Canning Plant—M. A. Travers, et al., Beach Rd., Watsonville, Calif., postponed indefinitely construction of a canning plant. Estimated cost $200,000. Private plans.

Canning Plant (Pineapple) — A. Granaday Canning Co., Inc., N. Thompson, Pres., Key West, Fla., will soon start work on the construction of a 90 x 300 ft. pineapple canning plant, 100,000 cases annual capacity at Florida East Coast Railroad property.

Creamery Plant—Corliss Creamery Co., 1762 West Carson St., Pittsburgh, Pa., will soon award contract for a 2 story, 98 x 160 ft. dairy building on Reedsdale St. Brazil & Anderson, 309 4th Ave., Pittsburgh, are architects.

Creamery and Dairy Plant — City Dairy Co., Pomona, Calif., awarded contract for a 1 and 2 story creamery and dairy plant including refrigeration plant, etc. at 6th and Garey Sts. to H. Poulsen, 645 North Towne Ave., Pomona. Estimated cost $45,000.

Dairy Plant—Industrial Realty Co., c/o Ballinger & Co., 100 East 42nd St., New York, N. Y., Archts. and Engrs., postponed construction of 1 and 2 story, 100 x 400 ft. dairy plant at Perth Amboy, N. J. Estimated cost $40,000. Puritan Dairy Products Co., 683 New Brunswick Ave., Perth Amboy, lessee. Indefinite when project will mature.

Dairy Plant—Summe Dairy Co., 4115 East 27th St., Kansas City, Mo., will soon receive bids for the construction of a 2 story dairy plant at 15th St. and Benton Blvd. Estimated cost $100,000. A. B. Fuller, 902 Orear Leslie Bldg., Kansas City, is architect.

Ice Cream Plant—H. P. Hood Sons Co., 500 Rutherford Ave., Charlestown, Mass., awarded contract for a 3 story, 75 x 185 ft. addition to ice cream plant at 56 Roland St. to Somers & Drisco, Park Sq. Bldg., Boston. Estimated cost $50,000.

Ice Cream Plant—Meyers & Powers Ice Cream Co., 800 6th St., Braddock, Pa., awarded contract for a 3 story, 20 x 100 ft. ice cream plant to J. Mooney, McKeesport.

Milk Distribution Plant — M. H. Renken Dairy Co., 584 Myrtle Ave., Brooklyn, N. Y., awarded contract for the construction of a 2 story milk distribution plant at Emerson Pl. and Myrtle Ave., to William E. Anderson, 885 Flatbush Ave., Brooklyn.

Milk Distribution Plant — Sheffield Farms Co. Inc., 524 West 57th St., New York, N. Y., will receive bids until Jan. 31 for the construction of a milk distribution plant at Jersey City, N. J. Estimated cost to exceed $100,000.

Ice Manufacturing Plant — Carlstadt Consumers Ice Co., 501 11th St., Carlstadt, N. J., is having plans prepared for remodeling ice manufacturing plant. Estimated cost $40,000. Engineer not announced. New machinery and equipment will be required.

Ice Manufacturing Plant—Supreme Coal & Ice Co., 551 Nostrand Ave., Brooklyn, N. Y., will soon award contract for the construction of an ice manufacturing plant at Lexington and Marcy Aves. Estimated cost $75,000. Bly & Hamann, 551 Nostrand Ave., Brooklyn, are architects.

Ice Plant—M. Burnett, Greenville, Tex., will soon start work on a 20 ton ice plant at Tyler.

Ice Plant — City of Ryan, Okla., is having preliminary plans prepared for the construction of a municipal ice plant. Estimated cost $17,000. W. M. Crowe, Ryan, is engineer.

Ice Plant—Crystal Ice Co., Inc., L. Margolin, Secy. and Treas., Omaha, Neb., awarded contract for a 1 and 2 story, 60 x 120 ft. ice plant at Easton and Spring Aves., St. Louis, Mo., to A. H. Stiel, 813½ Chestnut St., St. Louis. Estimated cost $100,000.

Ice Plant—Framingham & Natick Ice Mfg. Co., c/o J. A. Hill, 90 Pond St., Natick, Mass., will build a 1 story, 60 x 110 and 75 x 95 ft. artificial ice plant, storage building, etc. on West Central St. Estimated cost $75,000. C. Coneby Engineering & Construction Co., 1580 Ansel Rd., Cleveland, O., are engineers. Work will be done by separate contracts.

Ice Plant—Greenville Ice & Coal Co., I. B. Isenberg, Mgr., Greenville, Miss., awarded contract for remodeling ice plant to York Ice Machinery Corp., 609 Tchoupitoulas St., New Orleans, La. Estimated cost $45,000.

Ice Plant—Knickerbocker Ice Co., 41 East 42nd St., New York, N. Y., awarded contract for the construction of an ice plant at Long Beach, to Kuhn Smith & Harris, 225 West 34th St., New York, N. Y. Estimated cost $30,000.

Ice Plant—Mongiello Bros., 626 Communipaw Ave., Jersey City, N. J., will receive bids about Mar. 1, for the construction of a 1 story, 110 x 110 ft. ice plant including ice making machines, tank, storage rooms, etc. Estimated cost $50,000. C. H. Ziegler, 26 Journal Sq., Jersey City, is architect.

Ice Plant—Southern Ice & Utilities Co., F. Stroup, Local Mgr., Malvern, Ark., will build a 1 story, 60 x 90 ft. ice plant at Main and Dyer Sts. Estimated cost $40,000. Work will be done by local labor under the supervision of V. Z. Mitchell, Const. Supt.

Ice Plant—Southern United Ice Co., F. I. McClandish, Ch. Engr., Belzoni, Miss., awarded contract for a 30 ton ice plant to S. P. Azewell, Belzoni.

Ice Plant—Syndicate, c/o I. B. McNair, Barrister, N. B., plans the construction of an artificial ice plant at Fredericton. Estimated cost $50,000.

Ice Plant — Western Illinois Ice Co., Galesburg, Ill., will build a 1 story, 50 x 150 ft. ice plant at Kewanee. Estimated cost $60,000. Westerlin & Campbell, 1113 Cornelia Ave., Chicago, are architects. Work will be done by owner's forces.

Ice and Cold Storage Plant—Consumers Ice & Cold Storage Co., 9th and C Sts., Sacramento, Calif., awarded contract for addition to refrigerator car ice and cold storage plant, to W. W. Williamson, 320 Market St., San Francisco. Estimated cost $150,000.

Ice and Cold Storage Plant — T. Newton, Court House, and T. Donoghue, 119 Daniel St., San Antonio, Tex., plan the construction of a 30 ton ice and cold storage plant. Estimated cost $40,000. Private plans.

Ice and Cold Storage Plant—Sawyer Coal & Ice Co., c/o E. J. Sawyer, 6th St., Macon, Ga., is having plans prepared for the construction of a 1 story ice and cold storage plant. Estimated cost $75,000. C. T. Baker, Walton Bldg., Atlanta, is architect.

Pre-Cooling Plant—Olive Heights Citrus Assn., B. H. Cole, Mgr., Olive, Calif., is having plans prepared for the construction of a pre-cooling plant. Estimated cost $75,000. Private plans.

Refrigeration Building — Evansville Ice & Storage Co., Evansville, Ind., awarded contract for the construction of a 50 x 101 ft. refrigeration building at 8th and Court Sts., to Long & Smith, Evansville. Estimated cost $25,000.

Refrigeration Building—Henry J. Lohrey Co., 2232 East St. N. S., Pittsburgh, Pa. (meat packers), awarded contract for a 4 story, 50 x 50 ft. refrigeration building to H. A. Bloedel, 3720 Ruggles St., Pittsburgh.

Refrigeration Plant — Dept. of Hospitals, Municipal Bldg., New York, N. Y., plans the construction of a refrigeration plant at Randall Island. Estimated cost $40,000. Van Wart & Wein, 347 Madison Ave., New York, are architects.

Plant—Carbon Dioxide & Chemical Co., F. Goodwin, Exec. V. Pres., Woodside, Utah, has work under way on the construction of first unit of dry ice plant. $50,000. Total cost $1,000,000. Work is being done by day labor.

Cheese Factory — Kraft-Phoenix Cheese Co., Dale, Ind., will soon receive bids for the construction of a 1 story, 55 x 110 ft. cheese factory. Estimated cost $41,000. Private plans.

Fruit Warehouse — Canadian National Railways, St. James St., Montreal, Que., awarded contract for a 3 story, 76 x 638 ft. fruit warehouse, including unloading platform, etc., between Guy and Seigneurs Sts., to Atlas Construction Co., 37 Belmont St., Montreal. C. B. Brown is chief engineer.

Fruit Building — Vermont Fruit Co., B. J. Fayette, Burlington, Vt., is having plans prepared for the construction of a fruit building including refrigeration storage building at Battery and Maple Sts. Estimated cost $100,000. Private plans.

Fruit Exchange Building—Pennsylvania R.R., Broad St. Station, Philadelphia, Pa., will receive bids until Feb. 21, for a 1 and 2 story, 72 x 660 ft. fruit exchange building at Mount Vernon Yards, Baltimore, Md. T. J. Skillman, Philadelphia, is chief engineer.

Fish Hatchery—Bureau of Fisheries, Washington, D. C., plans the construction of buildings, ponds and accessories, at Thousand Springs ranch on Snake River at Filer, Idaho, in connection with fish hatchery. Estimated cost $60,000.

Fish Hatchery—State Game, Fish & Oyster Commission, Austin, Tex., awarded contract for the construction of a fish hatchery at Huntsville, to J. F. Bruckner, Cleburne, $21,409.

Grocery Warehouse — Ballinger & Co., 12th and Chestnut Sts., Philadelphia, Pa., Archts., will receive bids about Feb. 15, for the construction of a 1 story grocery warehouse at Fayeth and Read Sts., Perth Amboy, N. J., for Greenspan Bros., 226 Washington St., Perth Amboy. Estimated cost $150,000.

Potato Chip Factory—Blue Bird Potato Chip Co., 68th Ave. and Beck St., Oakland, Calif., received lowest bid for the construction of a 1 story factory on 81st Ave. from H. Paige, 5651 Oak Grove St., Oakland, $35,755.

Rendering Plant — East St. Louis Rendering Co. National City, Ill., will soon receive bids for a 3 story, 40 x 75 ft. plant for the manufacture of hog and chicken feeds. Estimated cost $60,000. C. E. Smith & Co., 1752 Railway Exchange Bldg., St. Louis, Mo., are architects.

Refinery (Corn Sugar)—Corn Products Refining Co., 17 Battery Pl., New York, N. Y., will receive bids after Feb. 1 for the construction of a corn sugar refinery to include machine shop, power house, etc., at Pekin, Ill. Cost exceeds $1,000,000; also plans additions to refinery at Kansas City, Mo. Exceeds $200,000.

Refinery (Sugar) — Holly Sugar Co., West Channel, Stockton, Calif., plans the construction of a sugar refinery at Stockton, also warehouse at Tracy. Estimated cost $150,000 each.

Refinery (Sugar) — Liquid Sugar Corp., 637 Battery St., San Francisco, Calif., plans the construction of a 3 and 4 story refining and manufacturing plant at San Jose. Estimated cost $100,000. Private plans.

Terminal Building—H. C. Bohack, Flushing and Metropolitan Aves., Long Island City, N. Y., has work under way on the construction of a terminal building at Newtown Creek, Maspeth. Estimated cost $2,000,000. Koch & Wagner, 32 Court St., Brooklyn, are architects.

Yeast Manufacturing Plant—Anheuser-Busch Co., 721 Pestalozzi St., St. Louis, Mo., awarded contract for the construction of a yeast manufacturing plant, 100,000 lbs. daily capacity, including garage, machine shop, power plant, etc., at Old Bridge, N. J., to Stone & Webster Engineering Corp., 120 Broadway, New York, N. Y. Estimated cost $2,000,000.

Alfalfa Mill and Warehouse — Pecos Valley Alfalfa Mill Co., L. P. Cloward, Local Mgr., Hagerman, New Mexico, plans the construction of a 40 ton alfalfa mill and 900 ton warehouse at Chandler, Ariz. Estimated cost $30,000.

Flour Mill—Parker & Wilson Flour Mills, Shelburne, Ont., plans to rebuild flour mill recently destroyed by fire. Loss $50,000. Complete equipment will be required.

Flour Mill—Vitamin Milling Co. of Canada, W. Brooks, Mgr., 503 McKinnon Bldg., 19 Melinda St., Toronto, Ont., awarded contract for a 2 story, 50 x 60 ft. whole wheat flour mill at Tavistock, to Pounder Bros., 45 Cambria St., Stratford. Estimated cost $60,000. Also plans a mill at Brampton, $50,000 to $60,000. Architect not selected.

Flour and Chopping Mills — Burns Bros., Meaford, Ont., plans to rebuild flour and chopping mills recently destroyed by fire. Loss $100,000. Complete equipment will be required.

Flour and Feed Mill—Willis Salmon, Morrisburg, Ont., plans the construction of a flour and feed mill. Estimated cost $25,000.

Flour Mill, Oil Mill, etc.—H. Dittlinger Roller Mills Co., New Braunfels, Tex., acquired the Landa Industries and is having surveys made for improvements to flour mill, oil mill, etc. New machinery and equipment will be required.

Grain Elevator—Burrus Milling Co., 2701 Alamo St., Dallas, Tex., plans the construction of a grain elevator, 1,000,000 bu. capacity at Amarillo. Work will start about Feb. 16.

Grain Elevator — Missouri Pacific R.R., Missouri Pacific Bldg., 13th and Olive Sts., St. Louis, Mo., will receive bids about Mar. 1 for superstructure of a 150 x 420 ft. grain elevator, 2,500,000 bu. capacity, including 126 storage bins, etc., at Kansas City. Estimated cost $1,500,000. E. A. Hadley, St. Louis, is chief engineer. Continental Export Co., Merchants Exchange Bldg., St. Louis, is lessee. Foundation contract let.

Grain Elevator Addition—Lone Star Elevator Co., Fort Worth, Tex., will build addition to grain elevator. Estimated cost $55,000. Work will start soon by owner's forces.

Grain Storage Tanks — White Flour Mills, Kingfisher, Okla., is having preliminary plans prepared for addition grain storage tanks. Estimated cost $50,000. Private plans.

Wheat Mill — P. G. Kemp, Vice Consul, Helsingfors, Finland, reports a milling company has applied to Government for loan of $250,000 for construction of modern wheat mill at Waso. Reference Finland 11662.

Packing Plant—Nootka Packing Co., Nootka, B. C., plans the construction of a herring reduction plant. Estimated cost $75,000.

Packing Plant — Union Packing Co., 3030 East Vernon St., Los Angeles, Calif., awarded contract for a 2 story, 50 x 145 ft. packing plant on East Vernon Ave. to T. R. Cooper Co., Western Pacific Bldg., Los Angeles.

Packing (Fruit)—J. L. Croker, Joplin, Mo., plans the construction of a fruit packing plant at Okmulgee, Okla., also meat packing plant at Okewah. Estimated cost $50,000 and $150,000 respectively. Private plans.

Packing Plant (Meat)—Circle Bar Cattle & Packing Co., c/o W. W. Barron, Pres., Rotan, Tex., is having preliminary plans prepared for a meat packing and refrigeration plant. Estimated cost $150,000. Private plans. Complete equipment will be required.

Packing Plant (Meat and Poultry)—George A. Hormel & Co. of Texas, Ave. A and James St., San Antonio, Tex., is having preliminary plans prepared for the construction of a meat and poultry packing plant including refrigerating facilities, killing and dressing department facilities, etc., at San Angelo. Estimated cost $75,000.

Poultry Building—State of California, Sacramento, Calif., is having plans prepared for the construction of a poultry and livestock building at State Fair Grounds. Estimated total cost $200,000. B. G. McDougall, Public Works Bldg., Sacramento, is state architect.

Poultry Market and Packing Plant — Two Thousand Sixty West 17th St., Corp., D. Berman, Pres., 3145 East 4th St., Brooklyn, N. Y., is having plans prepared for a 2 story, 40 x 62 ft. poultry market and packing plant at Cropsey and Neptune Aves. Estimated cost $40,000. F. Savignano, 6005 14th Ave., Brooklyn, is architect.

Poultry Warehouse — Poultry Producers of Central California, 700 Front St., San Francisco, Calif., awarded contract for a 3 story poultry warehouse at Sansome and Vallejo Sts. to Sommarstrom Bros., 2924 San Pablo Ave., Oakland. Estimated cost $140,500.

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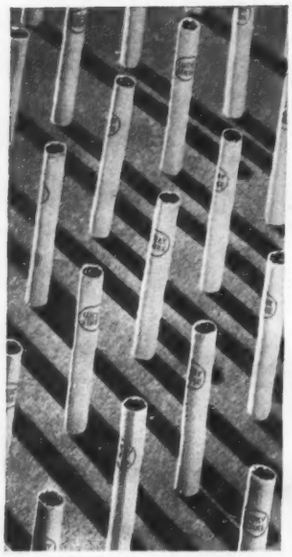

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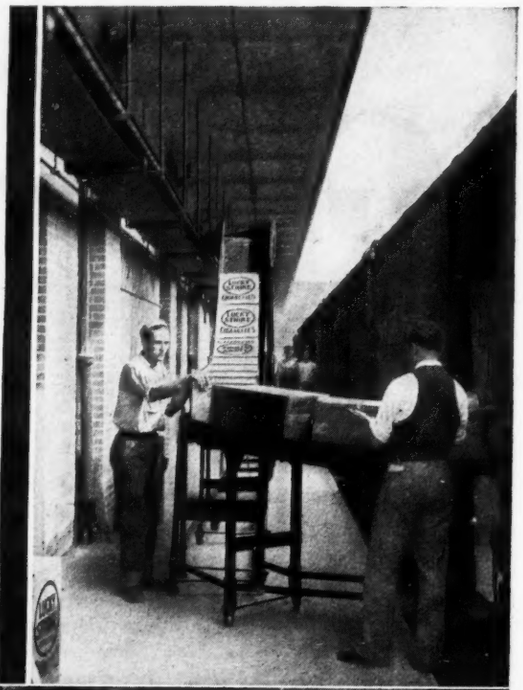
Movable slide deflects cartons from overhead belt into freight cars.



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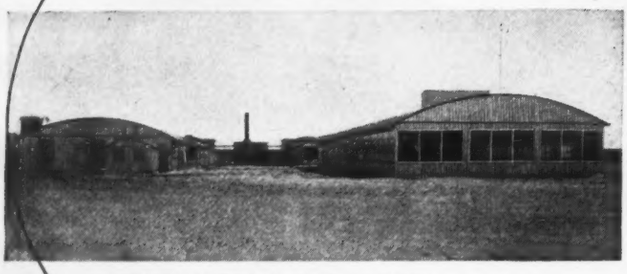

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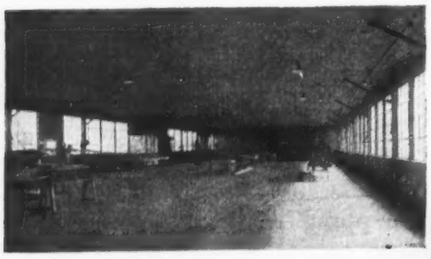

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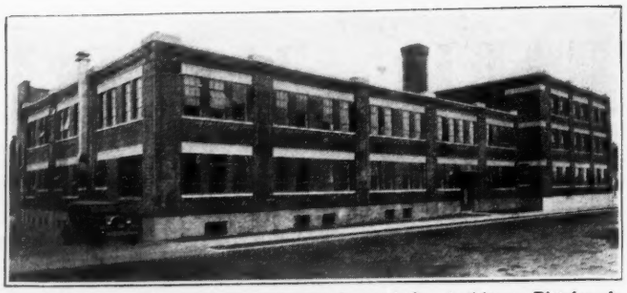

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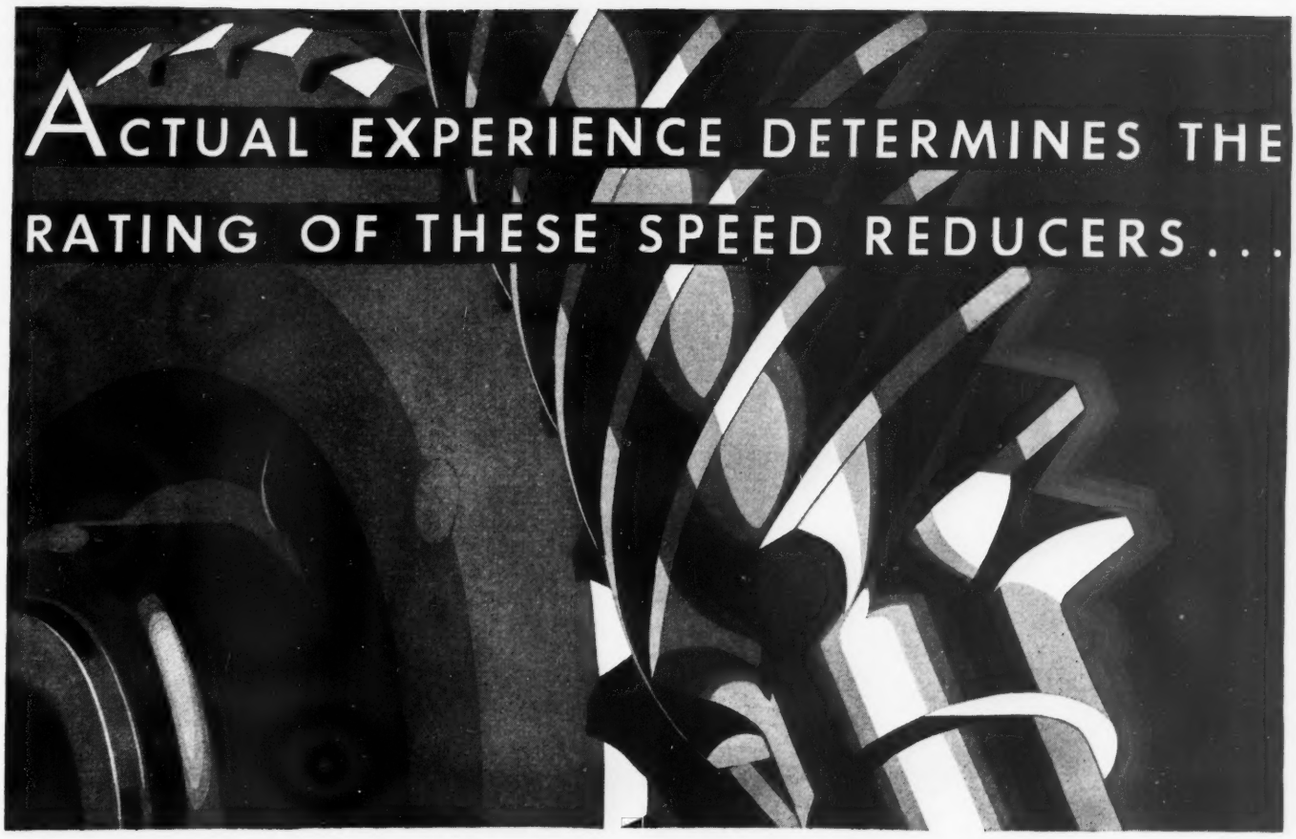

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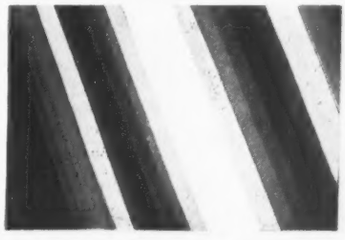
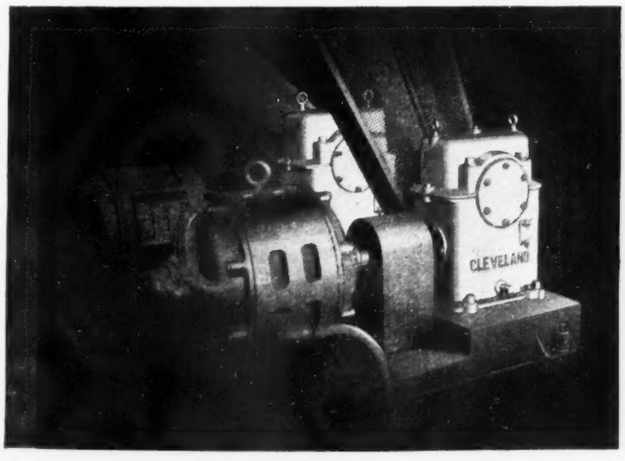
As there are more than 20,000 "Cleveland" drives in industrial use, "Cleveland" service factors are based on PERFORMANCE FACTS, definite and proved.

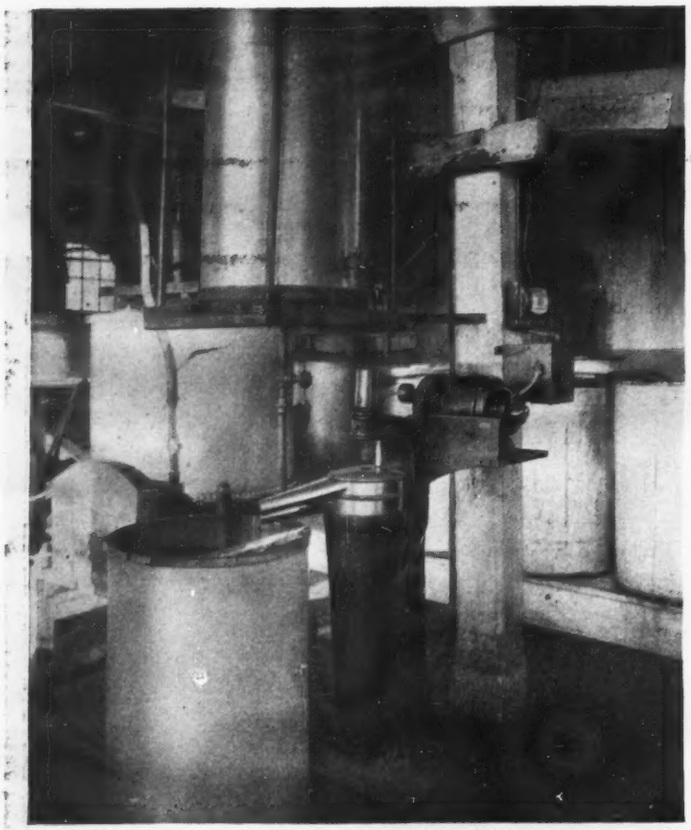
That is why engineers everywhere accept "Cleveland's" recommendations as standard. These men know that "Cleveland" Worm Gear Units are fitted to the job by a conservative and scientific method of rating. They know that such a rating coupled with high quality materials, precision workmanship and advanced design insures economical and unfailing service on any job—whatever its nature.



Two Cleveland drives, Type A H driving a conveyor and raw sugar elevator in a refinery. Unit in foreground: Ratio 5:1, 17 h.p., 880 r.p.m.



CLEVELAND
WORM & GEAR COMPANY
3278 EAST 80TH STREET . . . . . CLEVELAND, OHIO
CLEVELAND WORM GEARING . . . THE ULTIMATE DRIVE



An installation of a Sharples Super-Centrifuge at plant of Curtice Bros. Co., Rochester, N.Y., for purifying maple syrup. This unit has contact parts of Monel Metal.

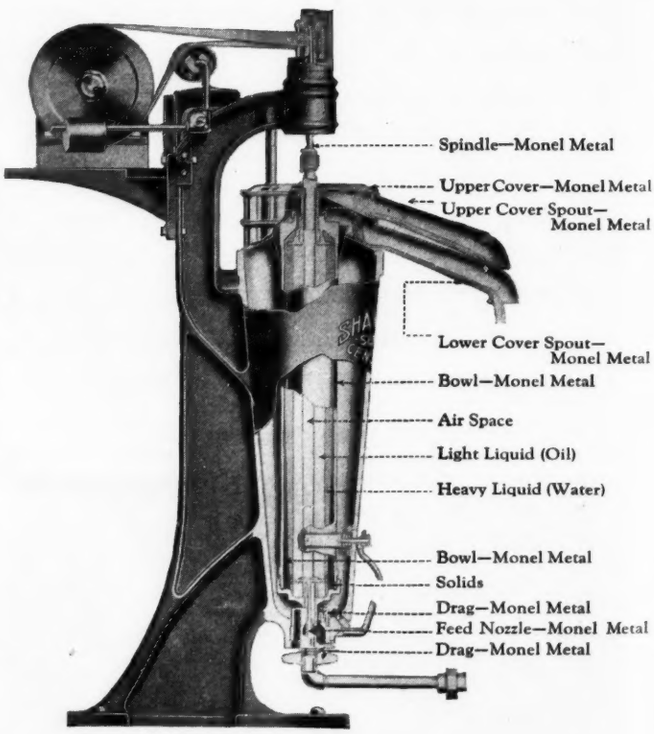
MONEL METAL CENTRIFUGES PRODUCE A CLEANER MAPLE SYRUP

THE clear, delicious maple syrup made by Curtice Bros. Co., is typical of the food product quality obtained with Monel Metal equipment. This syrup never has that smoky, cloudy appearance, because it is clarified in centrifugals having bowl, feed nozzles, spouts and other vital parts of Monel Metal.

The reasons why modern food canners and packers specify Monel Metal for parts of equipment which come in contact with the product are manifold. To sum them up:

1. Monel Metal, being highly resistant to corrosive attacks of food acids, does not contaminate or impair the flavor of the product. It leaves no trace of a metallic or foreign taste and protects the color of food products.
2. Its silvery, glass-smooth, hard surface is very easy to clean and sterilize.
3. Since Monel Metal is approximately two-thirds Nickel and one-third copper, it is absolutely rustproof.
4. It is tough and strong as steel, with no coating or plating to chip off. Solid throughout, like sterling, Monel Metal insures years of low cost service.

These properties make Monel Metal ideal for processing many kinds of fruit and vegetable juices. Monel Metal centrifugals are used in clarifying beverages, syrups, kraut juice, essential oils, sugar, jellies, etc. Consult your regular manufacturer about Monel Metal equipment, or write us.



Sectional flow view of Sharples Super-Centrifuge showing Monel Metal parts made by SHARPLES SPECIALTY CO., *Philadelphia.*

MONEL METAL

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

INCO MONEL METAL

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

PAYING ITS WAY
IN THE PROCESS INDUSTRIES

EVERY day — in scores of diversified process industries — the Sharples Super Centrifuge is paying its way by turning waste and losses into valuable profits. Outstanding Chemical, Pharmaceutical and Food Products plants rely on the Sharples for rapid, safe and sure clarifications, separations and dehydrations — and for recovery of values from waste materials.

Where present practices involve tanking large volumes of liquids — where filtration is slow and costly — where time is a vital factor — Sharples Technical Service is at your disposal.

Get the full facts — and you'll get a Sharples!

THE SHARPLES SPECIALTY CO.
2315 Westmoreland Street
Philadelphia

Branch Offices:
Boston, New York, Pittsburgh, Chicago, Detroit, Tulsa, San Francisco, Los Angeles, Toronto
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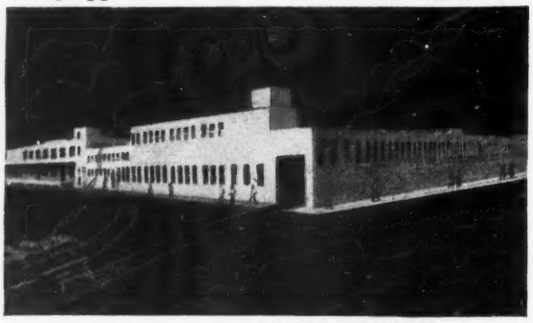
SHARPLES
CENTRIFUGAL ENGINEERS • • PHILADELPHIA

WHEN CONSIDERING HAZARDS CONSIDER DUST

Menace to Men, Machines, Materials, Now Controlled

Plants and buildings protected by insurance, sprinkler systems, burglar alarms, armored trucks, thief-proof fences, night watchmen, flood lights, all directed against the hazard that comes once in a life time—or never. And rightly so, because *when* the hazard comes, preparation pays. But what about the hazard that comes every day? DUST—spoiler of product, thief of good will, mortal enemy of machinery, sapper of efficiency. You can eliminate dust with modern air filters.

One of the greatest tests of efficiency of air filtering apparatus is in food manufacturing plants,



Air Filters Prevent Bacteria in Largest Gelatine Plant

where the prevention of foreign matter and bacterial contamination is essential. The general superintendent of the U. S. Gelatine Company, users of American Air Filters, reports in a survey by the A. C. Nielsen Company: "It is doubtful if we could have maintained our present volume of business if we had continued to use unfiltered air. Whereas we had little control over contamination, we can now assure users of a uniformly clean gelatine." Air filters can effect just as important improvements, business increases, savings and efficiency levels in your interests. AMERICAN AIR FILTER CO., *Incorporated,* Louisville, Ky.

AMERICAN AIR FILTERS

COMBINING PRODUCTS FORMERLY MANUFACTURED UNDER THE FOLLOWING TRADE MARKS:

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filters ALL METAL

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FREE LITERATURE

Read our bulletins on subjects affecting your business and other activities. Mail the coupon. No obligation.

American Air Filter Company, *Incorporated,*
117 Central Ave., Louisville, Ky.

Please send literature explaining the applications of modern air filters. Use in which particularly interested _____

Name _____

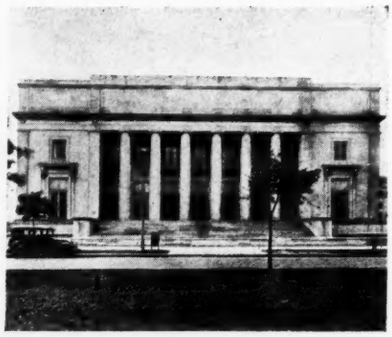
Street _____

City _____ State _____

How Leading Schools and Colleges Raise Efficiency Levels

Rooms and buildings may be kept thoroughly clean at all times, but every stream of ventilating air is laden with street dust and bacteria which finds easy lodgment in the delicate tissues of the lungs and throat. Colds and flu and contagious germs are spread in this way.

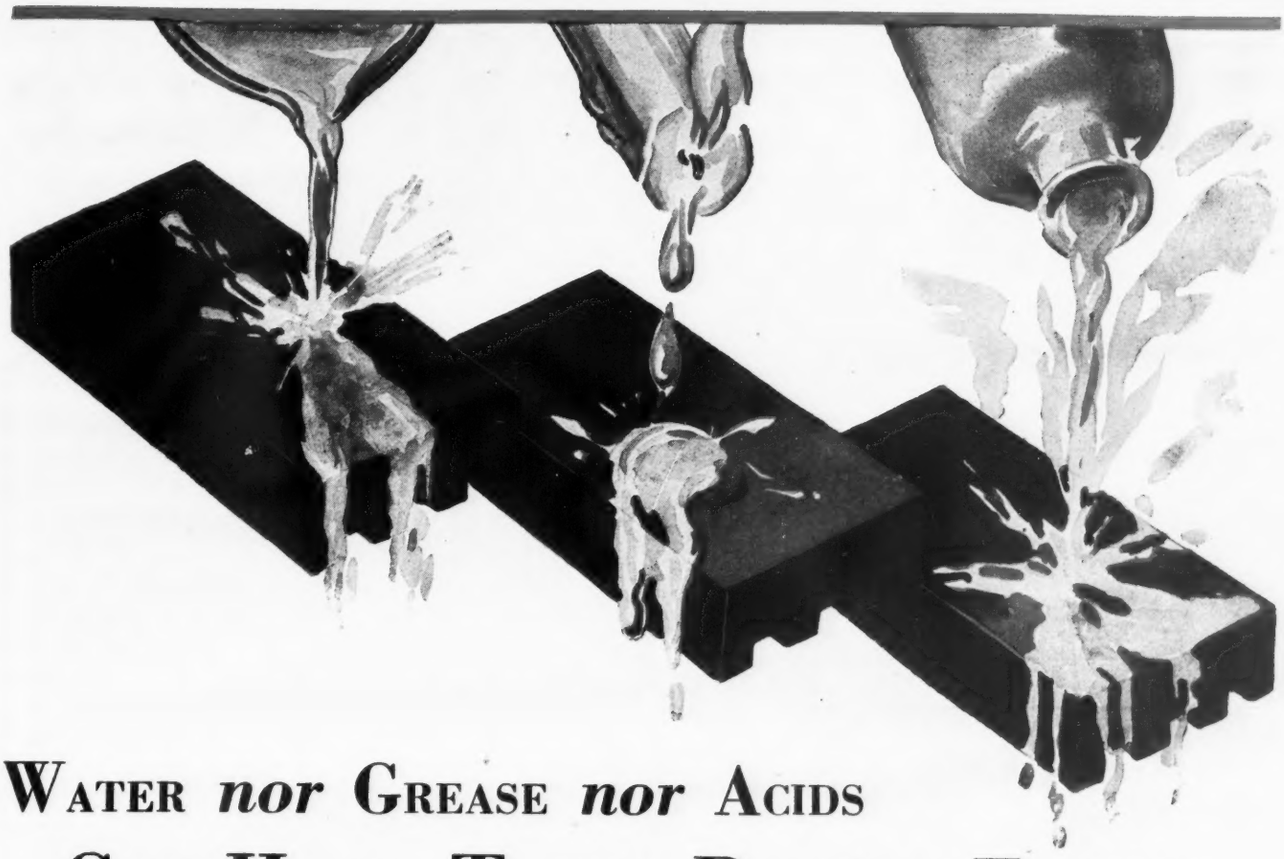
Only by a scientifically controlled system of air filtration can the air be cleansed of the dust and dirt and germs that are so destructive to equipment, materials, and to employee health and energy. Industrial and commercial institutions are protecting both products and employees by installing systems for air filtration.



The Walker Memorial Building, Massachusetts Institute of Technology where controlled filtration provides clean, pure air.

Leading educational institutions have made notable advancement in these respects by installing systems of air filtration. The quantities of dust and dirt washed periodically from the cells of these air cleaning units (which otherwise would be deposited on floors and walls, and in the lungs of students) give startling indication of the value of air filters.

A significant testimony to the value of scientifically controlled air filtration is seen in the fact that when the alumni of the Massachusetts Institute of Technology made a gift recently to their alma mater, they decided upon the installation of air filters in the Walker Memorial Building. As skilled engineers they realized in full how great would be the savings to the building in cleaning and decorating costs and how important to students would be the constant stream of purified air.



WATER *nor* GREASE *nor* ACIDS
CAN HARM THESE BETTER FLOORS

Duratyle is the ideal flooring for the food processing plant. It is hard surfaced, non-porous and tough. It is acid proof; unaffected by grease or oil, live steam, heat, cold, flushing waters or cleaning fluids. And it is wear-proof . . . even constant trucking over it cannot wear holes or ruts, cannot crack its hard, tough surface.

For permanent floors, sanitary floors, easily cleaned floors . . . in cold rooms, in ovens, on factory floors . . . you need Duratyle.

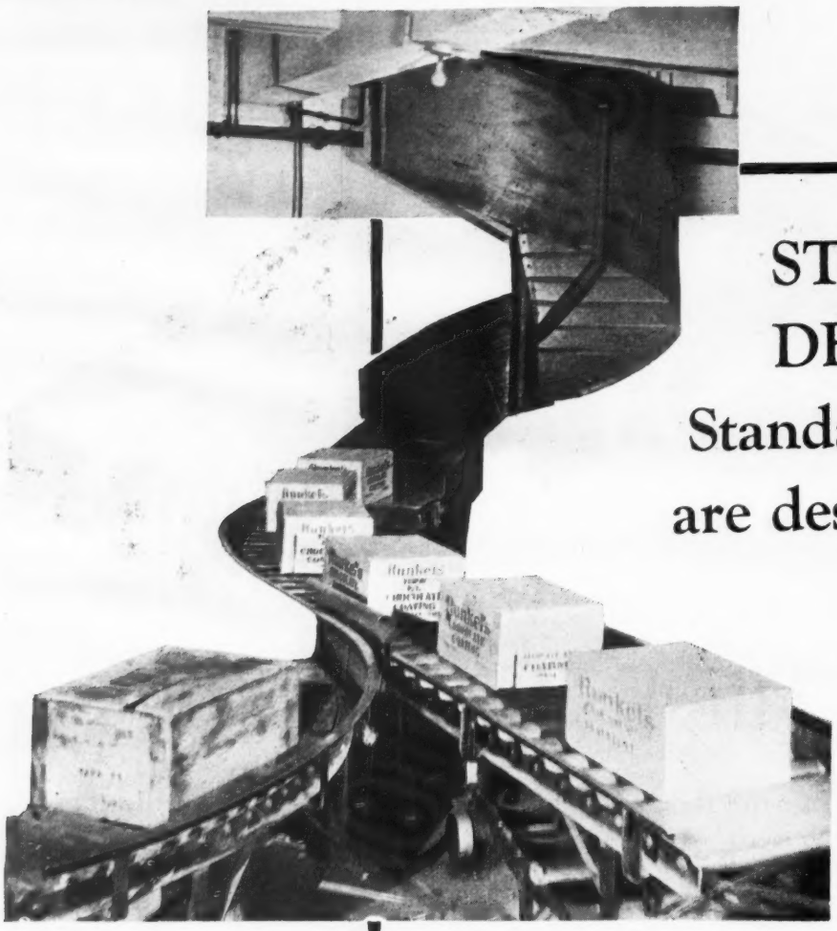
First cost is last and only cost when you lay Duratyle floors. Duratyle is the economical floor because it is the permanent floor.

Send for comparative cost figures and more details.

DREHMANN PAVING & CONSTRUCTION CO.

508 Glenwood Ave., Philadelphia, Pa.

Built for Service



STRONG AND DEPENDABLE, Standard Conveyors are designed to meet modern demands

Standard Conveyors have demonstrated their great value in hundreds of food plants. They are designed to speed up material handling and break the jam of congestion on the floors and shipping platforms.

Standard Conveyors are built by experienced material-handling engineers to stay in service even under the most severe operating conditions. Every detail of construction has been carefully studied to avoid breakdowns. The characteristic weaknesses of this type of equipment has been foreseen and guarded against, in an effort to make Standard Conveyors as nearly trouble-proof as possible.

Reliable Conveyor Counsel is available to you at any of the Standard branches listed below.

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CONVEYOR COMPANY

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BIRMINGHAM, 1202 Martin Bldg.
BOSTON, 755 Boylston St.
BRIDGEPORT, 406 Court Exch. Building
BUFFALO, 908 Ellicott Square
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CINCINNATI, 1106 Ingalls Bldg.
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PHILADELPHIA, 1541 Spring Garden Building
PHOENIX, Post Office Box 145.
PORTLAND, 53 First Ave.
PITTSBURGH, 1517 Clark Bldg.
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No. 606STH Service Caster—Hyatt Bearings—Timken Bearings—Service Ball bearings rolling in steel raceways—Alemite Lubrication

IMMUNE
to the Deadly Drag of Friction . . .

Friction, the universal and constant foe of Industrial Hauling, lays its hand secretly on trucking equipment, portable machines, and racks. A spell of sleeping sickness falls. Depreciation trebles its pace as the truck slows wearily. Waste in time and human energy mounts, unsuspected.

Crusaders against Friction and all its wastes designed Service Casters. The finest bearings, the best proved and tested lubrication, the clean-cut proportions demanded by highest engineering practice—these all were enlisted to dissipate lag and drag and surface resistance.

This was done for you. Equipment employing such casters as running gear was made for you. It is inevitable that Friction should already have taken its toll in your shop or plant. Now minimize that loss. ***Write for details of the Service equipment that will make you immune.***

SERVICE CASTER & TRUCK CO.
525 N. Albion St., Albion, Michigan

Chicago: 603 Washington Blvd. NewYork: 200 Lafayette St. San Francisco: 61 Bluxome St.
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Service
CASTERS & TRUCKS

"The Perfection is a pump—

not a churn"

"The only pump incorporating the internal helical gear." That is the Perfection Pump. It is due to this better gear principle that the Perfection Pump attains its smooth, steady, pulsationless flow, free from excessive churning.

Churning action is at a minimum in the Perfection Pump. The helical gear of this pump shears through the liquid on an angle instead of splashing through it head on, the usual method.

The Perfection is a sanitary pump. Easily accessible, easy to clean. Only two moving parts. It is highly finished inside.

For milk, cream, ice-cream mix, cut corn in canning factories, water, brines, molasses, and scores of other food products the Perfection Pump is unrivalled.

Perfection Manufacturing Co.

2186 Hennepin Ave.
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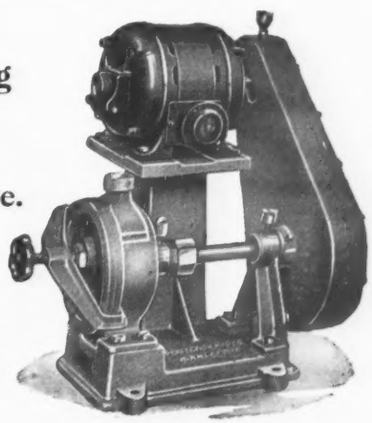
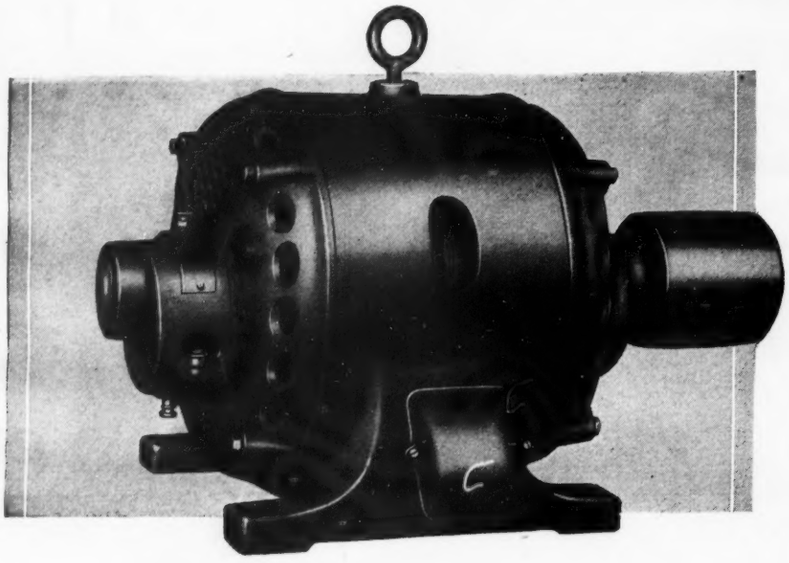


The Type 12 Chain Drive Pump requires little floor space—Motor is off the floor—two of its several features especially liked by its users.

THEY KEEP A-RUNNING



10 Horse Power Century Type SC Squirrel Cage Induction 3 and 2 Phase Motor.

CONTINUITY OF SERVICE

Rigidity, due to the liberal use of material properly placed, and firm anchoring of a well insulated winding preserves the "Keep a-Running" ability of Century general purpose application polyphase motors under the shocks of reciprocating equipment and the stresses and pounding of gear and chain drives.

Air spaces of substantial area to permit free circulation of air and thorough treatment of the winding with insulation varnishes, add to their value in dusty or damp atmospheric surroundings.

Century 250 Horse Power 60 Cycle 3 Phase Squirrel Cage Induction Motor equipped with ball bearings.

CENTURY ELECTRIC COMPANY

1806 PINE ST. • • ST. LOUIS, MO.

40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

SINGLE PHASE, THREE PHASE, AND DIRECT CURRENT MOTORS

Century MOTORS

MOTOR GENERATOR SETS, ROTARY CONVERTORS, FANS AND VENTILATORS

SC-1-10

FOR MORE THAN 27 YEARS AT ST. LOUIS

INCREASED NET PROFITS

Result from the use of this Drive!

You are looking for new ways to cut production costs!

Do you know what Texrope Drives will do for you?

On machine tool work, for example, the Texrope Belts absorb shocks and vibrations... resulting in a higher percentage of perfect work... longer life of your machines, decreased maintenance cost, greater efficiency.

In textile mills, breakage is reduced, due to smooth starting. In food product plants and laundries the absence of grease is an advantage... turning a hose on Texropes will cause no harm. On ventilating systems, the silent feature of Texrope is a decided asset.

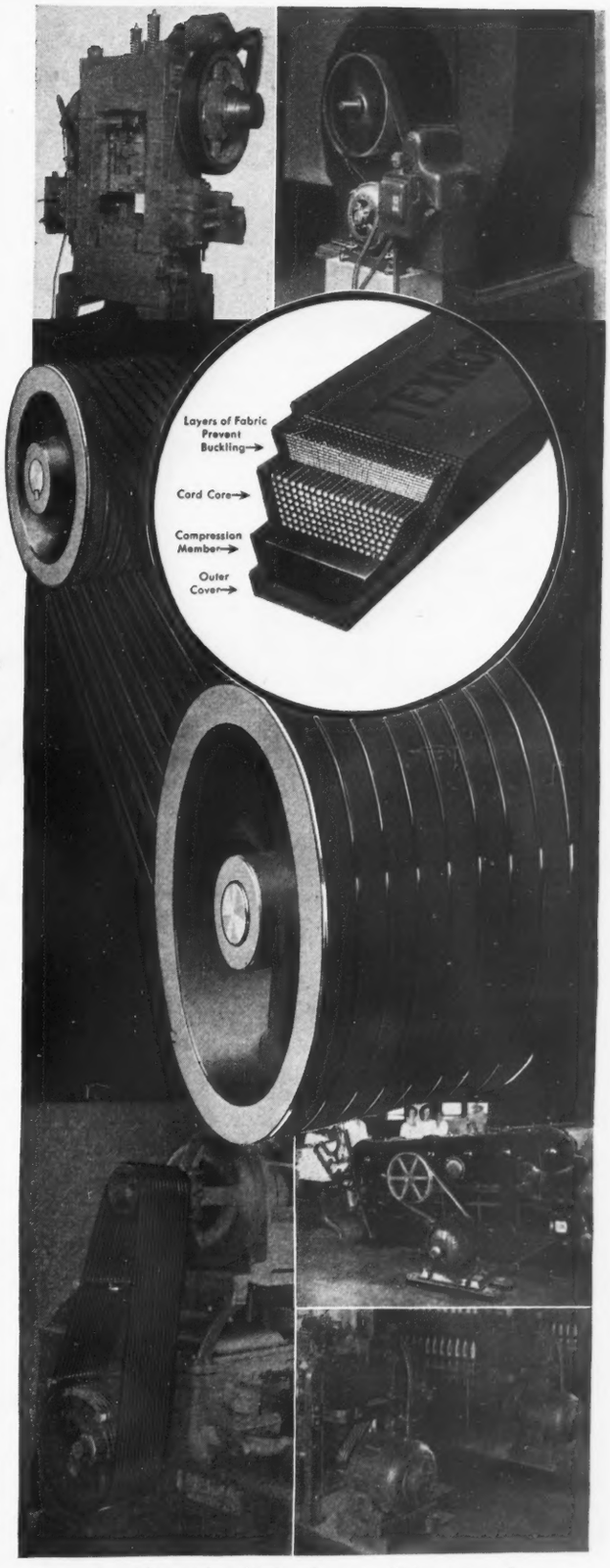
In every industry Texrope Drives have revolutionized transmission methods . . . opened the way to lower costs . . . and assured continuous operation. Ask for Bulletin 1228.

Over 100,000 Texrope Drives are now in satisfactory service. For light or heavy duty, they are equally efficient. They are transmitting loads as high as 2,000 H.P.

In applying Texrope Drives to your equipment, a trained Allis-Chalmers engineer is at your service . . . to check your loads, speeds, overload requirements ... and select a Texrope Drive that is guaranteed to give complete satisfaction. This service is yours for the asking . . . Call the nearest branch office . . .

ALLIS-CHALMERS MANUFACTURING CO., *(Texrope Division)*
Milwaukee ***Specialists in Power Machinery Since 1846*** **Wisconsin**

Atlanta, Ga., Baltimore, Md., Birmingham, Ala., Boston, Mass., Buffalo, N. Y., Charlotte, N. C., Chattanooga, Tenn., Chicago, Ill., Cincinnati, Ohio, Cleveland, Ohio, Dallas, Tex., Denver, Colo., Detroit, Mich., Duluth, Minn., El Paso, Tex., Grand Rapids, Mich., Houston, Tex., Indianapolis, Ind., Jackson, Mich., Kansas City, Mo., Los Angeles, Calif., Milwaukee, Wis., Minneapolis, Minn., New Haven, Conn., New Orleans, La., New York, N. Y., Philadelphia, Pa., Phoenix, Ariz., Pittsburgh, Pa., Portland, Ore., Richmond, Va., St. Louis, Mo., Salt Lake City, Utah, San Antonio, Tex., San Francisco, Calif., Seattle, Wash., Shreveport, La., Spokane, Wash., Tampa, Fla., Toledo, Ohio, Tulsa, Okla., Wilkes-Barre, Pa.



1—machine tool application; 2—on ventilating systems; 3—on Viscolizer; 4—on laundry machinery; 5—on spinning frames.

ORIGINATED BY ALLIS-CHALMERS

TEXROPE DRIVES

THE DRIVES THAT REVOLUTIONIZED TRANSMISSION PRACTICE • • •

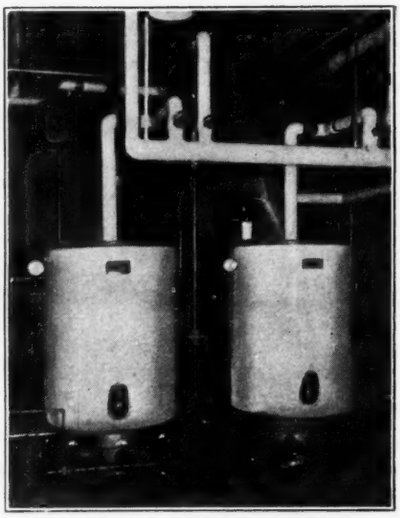
'Steam treatment' ---*must* be Automatic!

KANE

Wherever steam is required for processing, automatic operation is attempted as a matter of course. Fluctuations in temperature, volume, *quality and purity,* can be excessively disastrous when food is under treatment . . . Steam treatment must be automatic.

—Control your steam automatically at the *source!* It can be done, but only with an independent steam source—such as the KANE AUTOMATIC GAS-FIRED BOILER. Steam from a Kane never varies; it is always pure; it may be had without delays, too, or labor of firing and ash disposal or fuel problems.

And this explains why for food industries, the KANE is chosen: Capacities to meet your precise volume needs—compactness, to make installation easy—*Automatic control* for *consistent processing!*



Two 20-hp. KANE Boilers installed in the A. & P. Bakery, Chicago. In common with all branches of the food industry, bakeries need clean, unvarying steam, automatically controlled.

Send for Bulletins.

MEARS-KANE-OFELDT INC.

1903-1915 EAST HAGERT ST. PHILADELPHIA

New York—9 Park Place
Boston—100 Arlington St.
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Makers of Automatic Gas Boilers for over a Quarter Century

Scores of uses for RICE HULLS

For packing hygroscopic materials to prevent moisture absorption.

For filtering and percolating.

For insulation (hot or cold).

Ground filler for cleaning compounds, fertilizers, insect powders, for natural and synthetic resins, etc.

Many Advantages

Rice Hulls are clean and "springy." They are light in weight (only 7½ pounds per CUBIC FOOT). They are free-flowing and non-packing (cannot be packed even by mechanical means). They are NEUTRAL IN ODOR, and of slow combustibility.

Rice Hulls can be furnished ground also, through and/or over any mesh.

WRITE FOR SAMPLES AND PRICES

Sold sacked or bulk. Minimum weight, 30,000 pound carload. Low in price; economical to use.

McGILL BROTHERS RICE MILL

STUTTGART, ARKANSAS

T. SHRIVER & CO. FILTER PRESSES HARRISON, N.J.

SHRIVER SERVICE

is a friendly and highly cooperative effort placed at the disposal of customers and others interested in filtration problems. It embraces a modern, well equipped laboratory and an organization of specialists with a background of many years' successful experience in the design, manufacture and application of filter presses. Use this service to your profit.

T. SHRIVER & COMPANY

Established 1860

860 Hamilton Street Harrison, N. J.

A Filter Press For Every Purpose

SHRIVER

Filter Presses Filter Cloth Diaphragm Pumps

CHEMICAL SCIENCE
raises food industries to higher levels

CHEMISTRY and Chemical Engineering are keeping many a food processing plant out of the red, can do the same for many others, will do it for all who know how to utilize these great forces.

Every man responsible for methods, materials, machinery, processing efficiency, product quality and sales promotion in any branch of the food industries, owes it to himself, his profession, his employers and his Country to maintain that leadership necessary to prosperity via Chemistry and the allied sciences.

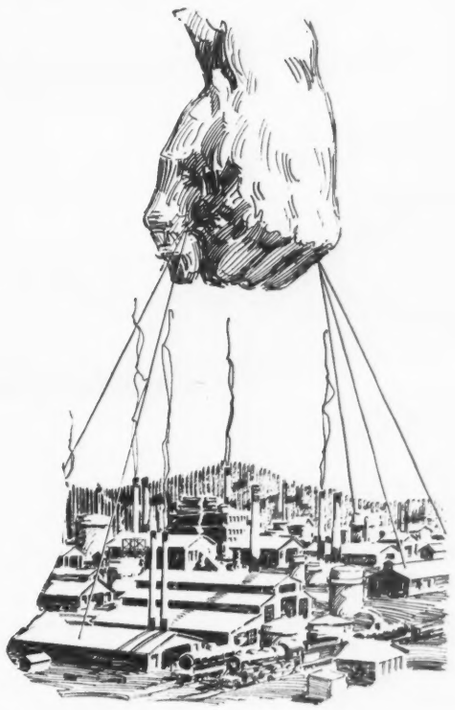
Ready to the hand of those for whom chemical science can do so much is this year's Exposition of Chemical Industries.

Viewed as a whole it will be a striking demonstration of Industry transformed by Science.

Viewed in detail, it is a post-graduate course without which previous education is hopelessly handicapped in dealing with the needs of the day.

Available at this great national institution of learning will be opportunities to discuss your interests with hundreds of specialists in attendance to serve you.

Exhibits—visual, tangible, comparable embodiments of progress—include the latest and best in processing equipment—materials, machinery, tools, instruments and supplies. A special section is devoted to material handling, packaging, containers, etc.



Attending this Exposition yourself is not enough. Bring from your organization those who have operating responsibilities requiring knowledge of modern methods, machines, materials. And bring those whose "sayso" counts when newer, better equipment is needed.

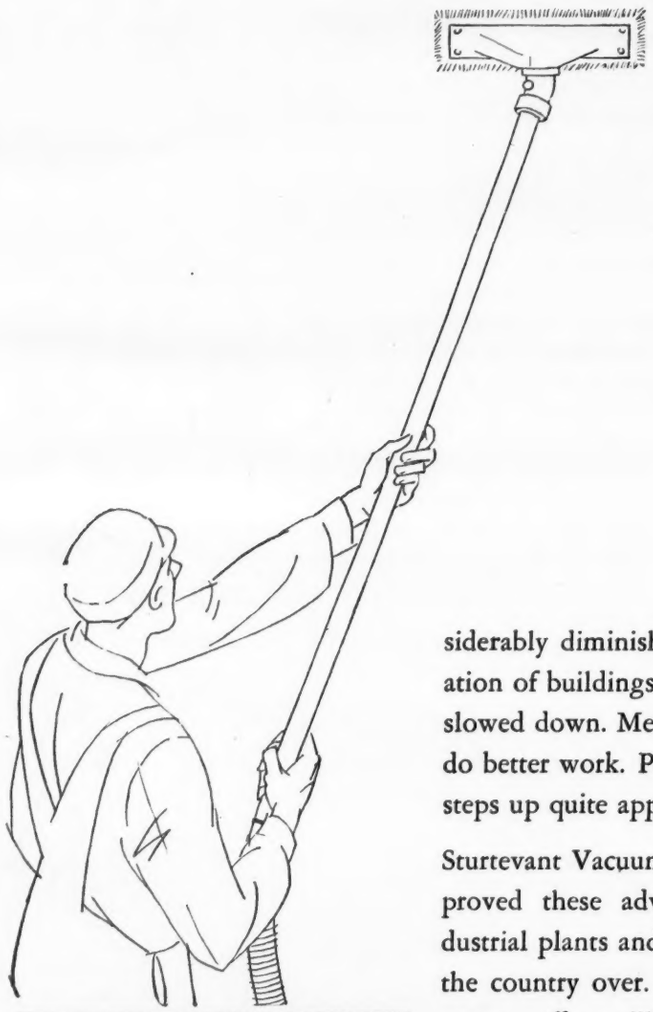
They'll be glad they came. So will you.

13th Exposition
CHEMICAL INDUSTRIES

Management International Exposition Company

52460

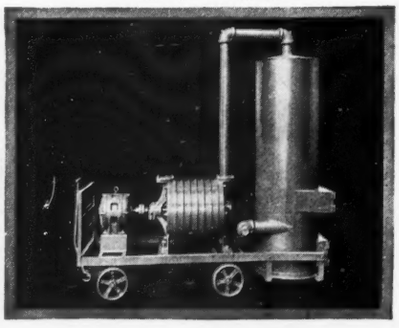
"Believe it or not... it's *cheaper* to keep the place clean!"



"BOSS says he figures it costs 20% less to keep the plant clean than it used to cost to keep it from getting too dirty!"

, , ,

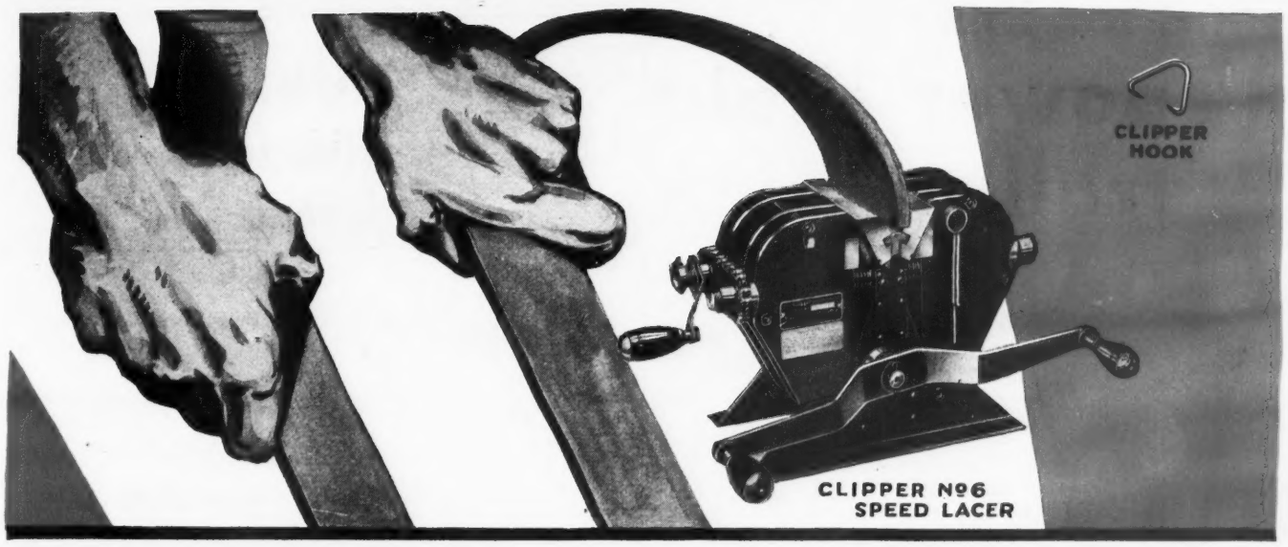
Quite right. Cleaning costs are usually cut 10% to 20% in time and labor alone, when Sturtevant Vacuum Cleaners are put to work. One man with a vac can do a better, quicker job than a gang of sweepers. Dust is picked up, not chased around . . . and thereby hangs a long list of benefits. Valuable wastes can be reclaimed. Dangerous dusts are kept out of harm's way. Fire hazard is considerably diminished . . . depreciation of buildings and equipment slowed down. Men and machines do better work. Production often steps up quite appreciably.



Sturtevant Vacuum Cleaners have proved these advantages in industrial plants and public utilities the country over. A line to our nearest office will bring you full information immediately.

B. F. STURTEVANT COMPANY
Main Offices: HYDE PARK, BOSTON, MASS. ▸ CHICAGO, ILL., 410 No. Michigan Ave., ▸ SAN FRANCISCO, CAL., 681 Market St.
Branch Offices in Principal Cities.
Canadian Offices at: Toronto, Montreal and Galt. Canadian Representatives: Kipp Kelly, Ltd., Winnipeg. Agents in Principal Foreign Countries.

Sturtevant REG. U.S. PAT. OFF. *Portable and Stationary* **Vacuum Cleaners**



CLIPPER LACED BELTS DRIVE THE MACHINERY OF THE WORLD!

North—South—East—West—from Occident to Orient—the machinery of the world's greatest industrial plants is driven by Clipper Laced Belts.

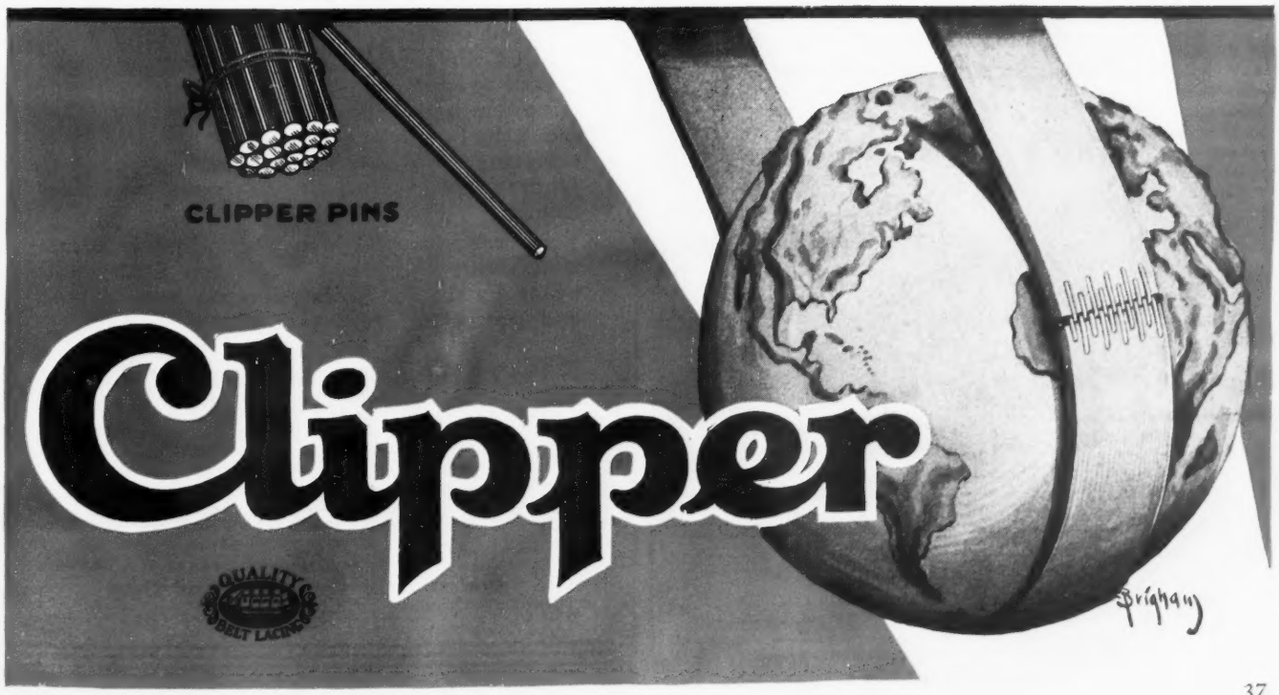
The Clipper No. 6 Speed Lacer is recognized as the last word in belt lacing speed and efficiency. Light and compact, yet marvelously powerful, it laces both ends of a six inch belt in exactly 90 seconds.

Clipper Hooks are unsurpassed in quality and durability, yet enormous production brings them to the user at a price actually 20 to 30% lower than that of other makes.

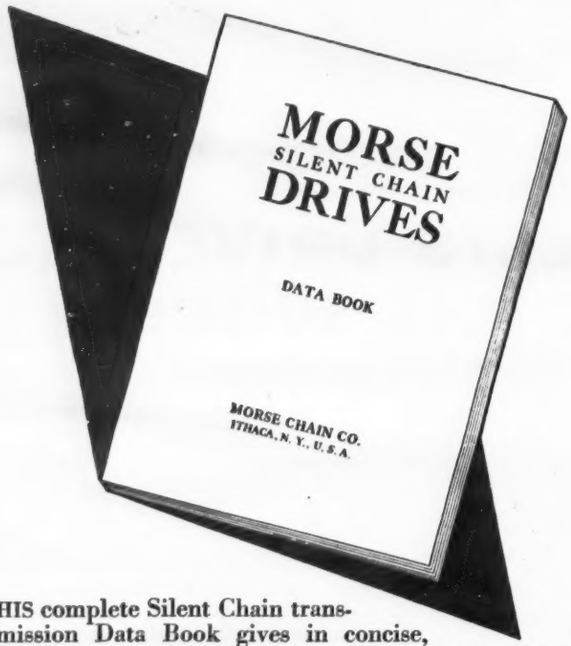
Plant executives seeking greater economy of operation and production efficiency during 1931 should standardize on Clipper equipment for every lacing need.

For complete demonstration communicate with your nearest dealer or with the

Clipper Belt Lacer Company, Grand Rapids, Michigan



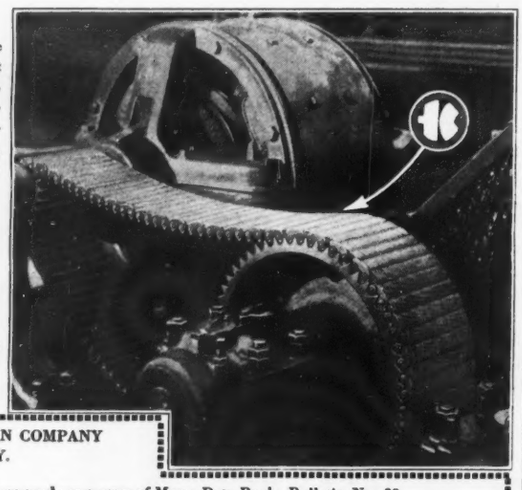
send for this power chain transmission DATA BOOK



THIS complete Silent Chain transmission Data Book gives in concise, readable form all the information needed to design, install and maintain Morse Silent Chain Drives. It is a ready reference for anyone faced with either standard or special power transmission installations. Sent upon receipt of coupon below.

MORSE CHAIN CO., ITHACA, N. Y.

Visit the Morse Chain Co. exhibit at the Fifth Midwestern Engineering and Power Exhibition, Chicago, February 10-14th. Booth No. 46



A Morse Drive on Short Centers

MORSE CHAIN COMPANY
ITHACA, N. Y.

Please send me a copy of Morse Data Book, Bulletin No. 38

*Name*_____

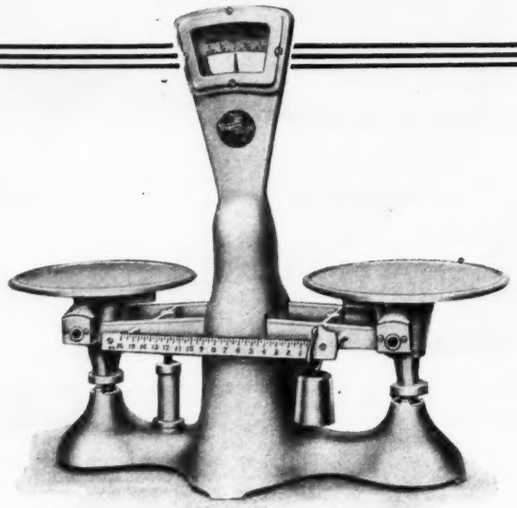
*Firm*_____

*Address*_____

*City*_____ *State*_____

FI-Feb. 31

Wide chart graduations Quick-acting pointer



This scale protects profits on packaged foods

Protect yourself against the loss that results from inaccurate weighing of packaged foods. Avoid the small errors that multiply to make substantial losses. Use Fairbanks Precision Scales on all packaging operations.

On Fairbanks Precision Scales weighing can be done faster *and more accurately.* "Unders" and "overs"— to 1/32 of an ounce—can be detected instantly by a glance at the clearly marked dial. Wide chart graduations make it easy to read correct weight quickly. There is no temptation to call it "close enough" because the fast-acting pointer registers without wavering. Little mistakes look big. Lasting accuracy is assured by Fairbanks construction.

Your request will bring complete information about Fairbanks Precision Scales and other Fairbanks Scales that are saving time and protecting profits in the food industry.

FAIRBANKS, MORSE & CO.
900 S. Wabash Ave., Chicago
And 40 principal cities—a service station at each house

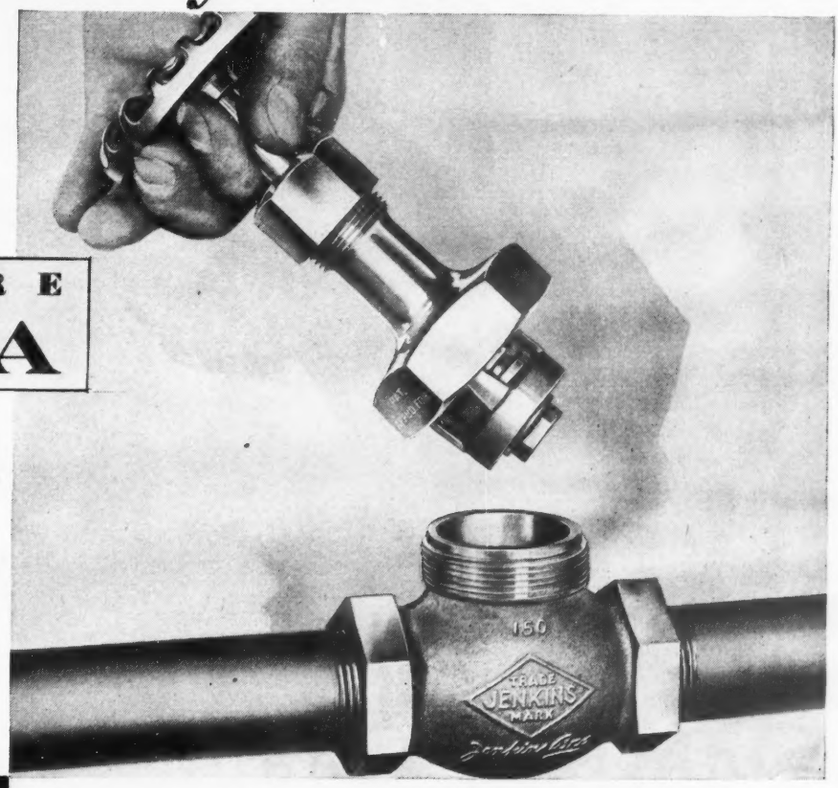
Fairbanks Scales

Preferred the *World Over*

SA 24.81

IT WON'T SLIP OFF
till you want it to...

FIGURE 106-A



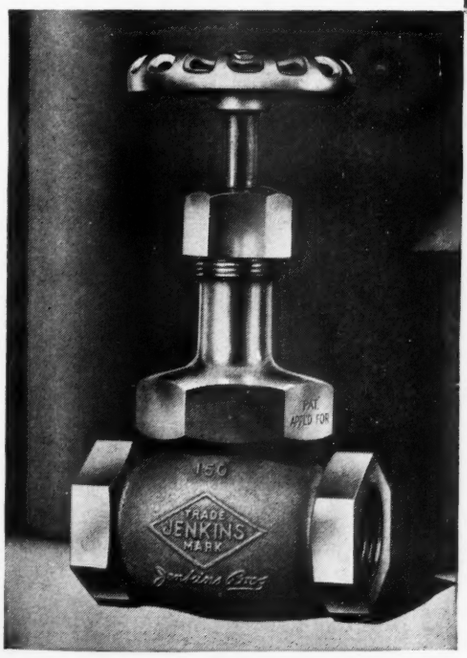


FIG. 106-A, *Screwed, Jenkins Standard Bronze Globe Valve with one-piece screw-over bonnet. Regularly fitted with Jenkins Composition Disc for 150 lbs. steam pressure, and when so ordered can be furnished with Jenkins Discs for oil, water, gas and other fluids.*

IN this Fig. 106-A, Jenkins Standard Bronze Globe Valve with the one-piece screw-over bonnet, the disc holder is of the slip-on type. But it won't slip off when the valve trimming is removed until you want it to!

Here is a real advantage when changing the valve disc. Before unscrewing the bonnet, give the hand wheel a turn or so. Then the hex of the bonnet holds the disc holder on the spindle. You can't shake it off. But a reverse turn of the wheel will cause the disc holder to drop into your hand.

This advantage, as well as the one-piece screw-over bonnet, can be obtained also in Jenkins Bronze Angle and Cross Valves, through your supply house. Write for detailed Bulletin 141.

JENKINS BROS.

80 White Street, New York, N. Y. | 524 Atlantic Avenue, Boston, Mass. | 133 No. Seventh Street, Philadelphia, Pa.
646 Wash. Blvd., Chicago, Ill. | 1121 No. San Jacinto, Houston, Tex.
JENKINS BROS., Limited, Montreal, Canada; London, England.
Factories: Bridgeport, Conn.; Elizabeth, N. J.; Montreal, Canada.

Jenkins
VALVES
Since 1864

JENKINS VALVES ARE ALWAYS MARKED WITH THE "DIAMOND"

FOR SAFE HANDLING *of foods. This 20-gallon fruit juice can of Allegheny Metal cleans as easily as glass. Made from one piece. Fabricated by Lalance & Grosjean Mfg. Co., Woodhaven, N. Y.*

One less Chance for Spoilage with THIS ALLOY

Allegheny Metal Contaminates No Food—No Food Corrodes It

THIS ALLOY meets all normal food conditions without rusting, staining or tarnishing. And under *any* condition Allegheny Metal proves to be the most satisfactory material available—because it does away with danger of metallic taste, discoloration or other contamination.

Allegheny Metal never needs replating, for there is no plating to wear off. It can be cleaned as easily as glass. It's stronger than mild steel... is hard to dent or scratch.

No costly delays due to necessity of scouring with abrasives and strong cleaning fluids.

For these reasons you find more and more Allegheny Metal being used every day. It's safe . . . beautiful . . . durable . . . easy to clean.

There probably is an Allegheny Metal installation near you. Visit it. See this wonder alloy work. See for yourself if Allegheny Metal is the material best suited to your needs. Then specify it.

Allegheny METAL

ALLEGHENY STEEL COMPANY, Brackenridge, Pa... *Offices:* New York, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Philadelphia, St. Louis, Milwaukee, Los Angeles. *Warehouse Stocks:* Joseph T. Ryerson & Son, Inc.—Chicago, Cleveland, Milwaukee, St. Louis, Cincinnati, Detroit, Buffalo, Boston, Jersey City, Philadelphia...*In Canada:* Samuel & Benjamin, Ltd., Toronto.

ALLEGHENY METAL

Licensed by the Chemical Foundation, Inc., under basic patents No. 1,316,817 and No. 1,339,378

Emergency protection, too

goes with your product shipped in WOODEN BARRELS

Once your products have been shipped from your plant they are beyond your control. You cannot govern the conditions they are to meet. Rough handling, exposure to weather—a thousand things can happen.

Wooden Barrels offer the best protection against these uncertainties in transit. Wooden Barrels withstand the jolts of careless handling. They also carry their own emergency protection because contact with moisture and dampness only cause the staves to expand still more tightly, sealing the contents against any contamination.

Protection against spoilage, deterioration, atmospheric changes are assured. Hundreds of varied food products, from syrups and soups to cranberries and cereals are packed in tight or slack Wooden Barrels.

Fewer men are required to handle it when a shipment is made in wooden barrels. No other container can be so easily rolled, steered, and upended.

The Associated Cooperage Industries will gladly give you data applying to any container problem.

THE ASSOCIATED COOPERAGE INDUSTRIES OF AMERICA

Railway Exchange Building

ST. LOUIS, MISSOURI

Some WOODEN BARREL Advantages

Protection

- Against contamination
- Against deterioration
- Against atmospheric changes
- Against dampness

Safe in Transit

- Arch design for strength
- "Resilience" due to multiple-stave pressure-bound construction
- Circular form "sheds" the force of blows in transit

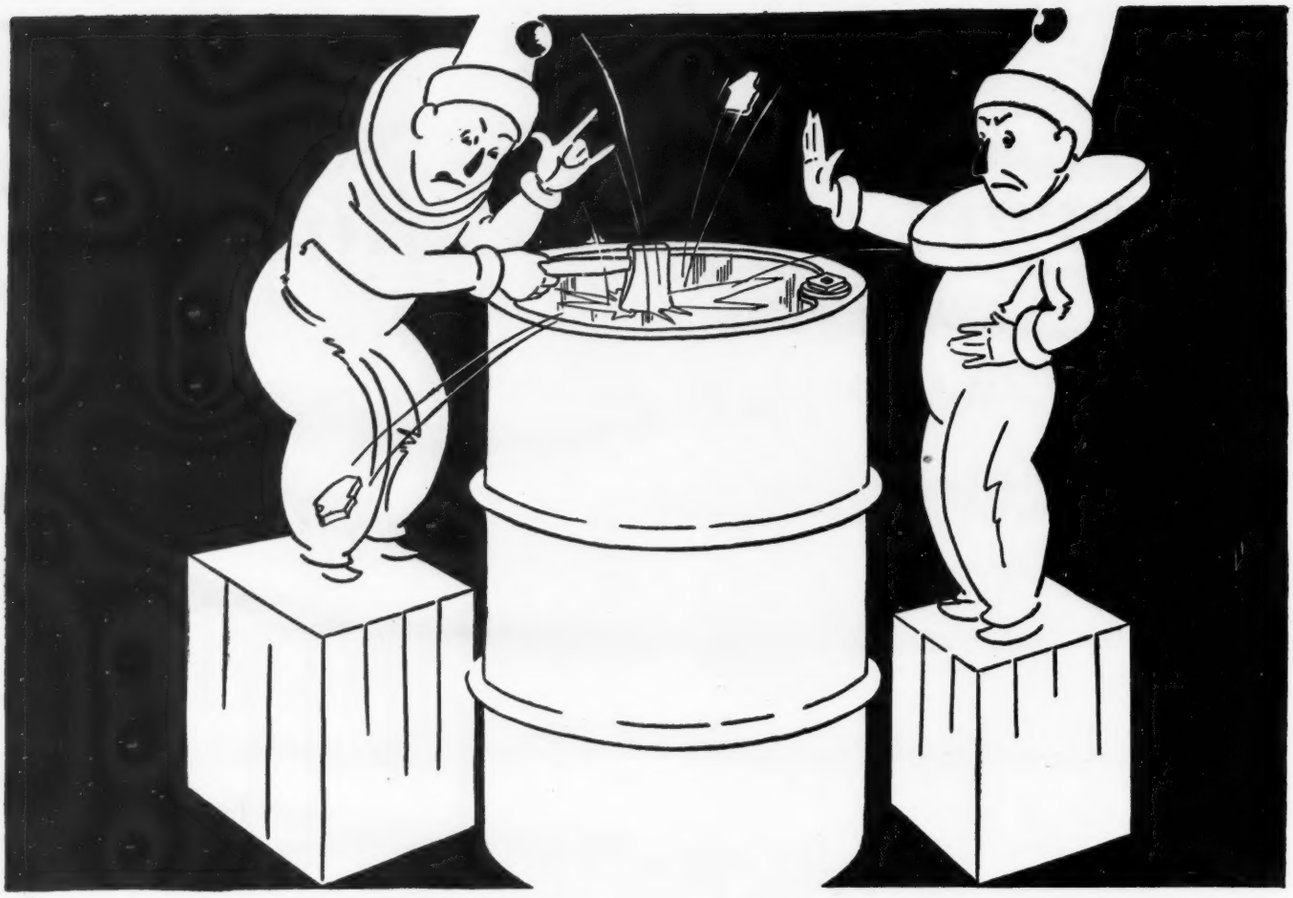
Sanitation

- Made of clean, fresh wood
- Contact with exterior moisture causes staves to seal still more tightly

Ease of Handling

- Easy to roll and to guide
- Easy to upend
- Easy to fill and to empty

WOODEN BARRELS



Why an Ice-Chopper?

No matter how much water freezes on the head of a Hackney Steel Drum, users never need to chop the ice away in order to empty the contents.

For the patented raised openings cannot freeze over.

And water and dirt can never seep in—even when the bungs are removed.

The brass brazed, unbreakable, forged steel bungs stand above it all.

That's a point your customers will appreciate this winter as well as yourselves—since containers are seldom kept constantly under cover.

In addition, the raised openings always make it easier to remove the bungs without barked knuckles—and to drain the drums *dry*.

, , ,

There are many other Hackney advantages, such as the brass brazed chime construction—expanded "U" hoops—and hot dip galvanizing. Write for complete details.

This is but one of the complete line of Hackney steel containers to better meet your shipping problems, shipping hazards—high costs

PRESSED STEEL TANK COMPANY

1173 Continental Bank Bldg. ..... Chicago
1349 Vanderbilt Concourse Bldg., New York City
5771 Greenfield Avenue ..... Milwaukee, Wis.
477 Roosevelt Building ..... Los Angeles

Hackney
MILWAUKEE

FOR GREATER *EFFICIENCY*

This modern Motoco Industrial Thermometer means greater efficiency in your plant production. It registers the correct temperature, of course, and *its clear-visioned dial makes incorrect temperature reading less likely.*

Its bold black-and-white dial and brilliant red pointer can be read plainly 20 feet away. When desirable, it may be installed upwards of 50 feet from where the temperature actually is taken . . . permitting you to mount all your gauges on one central control panel.

Motoco instruments of similar design are available for temperatures ranging from −40° to 750° Fahrenheit.

The Motoco permits you to bring your thermometer equipment up to date with modern, accurate, easy-to-read equipment. Our nearest representative will gladly discuss with you its other advantages and *greater profits* to your company.

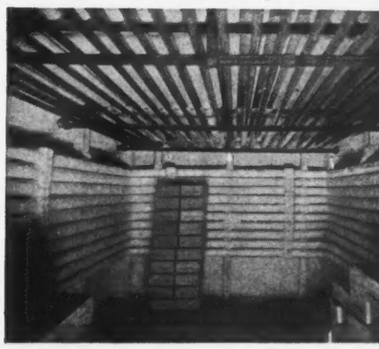
Moto Meter also manufactures a complete line of vacuum and pressure gauges

MOTO METER

GAUGE & EQUIPMENT CORPORATION

TOLEDO, OHIO

FACTORIES AT TOLEDO ' LA CROSSE ' CANADA
ENGLAND ' FRANCE ' GERMANY ' AUSTRALIA



THE CO-OP., TOO, KNOWS VILTER

Not only in food processing is Vilter ice-making and refrigerating machinery considered the standard . . . but in every other phase, as well.

For instance . . . the Bellingham plant of Washington Co-Operative Egg & Poultry Association uses an installation engineered by Vilter.

Here, with a Vilter Vertical (7½ x 7½) food storage is safe, simple, certain. The various desired temperatures are held unvarying for long periods.

And so economical is the operation of Vilter-designed systems that accurate control of temperatures is maintained at all times at the minimum cost.

For any application of refrigeration consult our Engineering Department. Write!

THE VILTER MANUFACTURING CO.
2115 So. 1st Street - Milwaukee, Wis.

SINCE *Vilter* 1867

ICE-MAKING AND REFRIGERATING MACHINERY

The Vilter Manufacturing Co.,
2115 So. 1st St., Milwaukee, Wis.

Gentlemen:

Please send me information regarding refrigeration for

.....

Name.....

Address.....

15-31

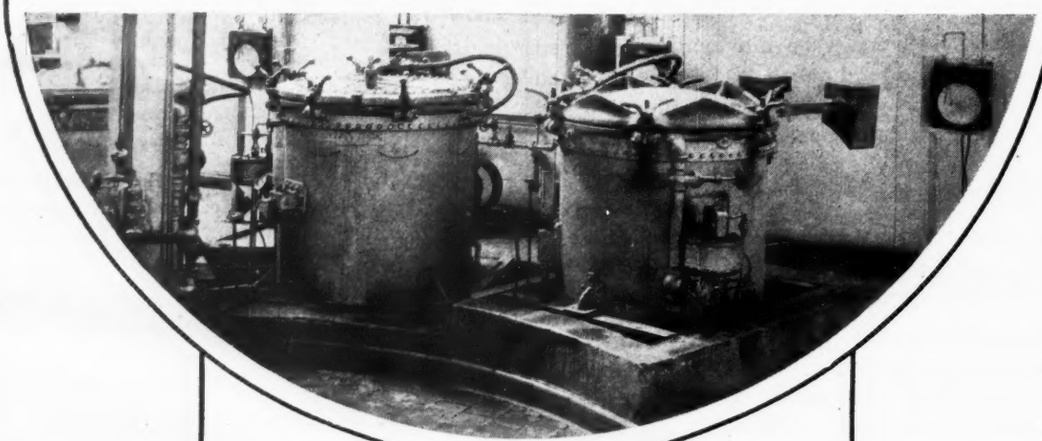
Set it . . . forget it . . .

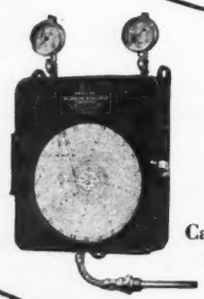
every batch is the same!

Tycos Recording Regulators are regarded as necessities in progressive food plants, as more and more plants install them. Why? Because *Tycos* Recording Regulators absolutely eliminate all chances for error in timing and controlling cooking temperatures. They control the steam. Timing starts when the batch temperature reaches the predetermined point. Cooking continues until the time element shuts off the steam. The next batch follows the same exact procedure, and the next—and next—.

No wonder so many manufacturers who cannot afford to market a non-uniform product, install *Tycos* Regulators on cooking, sterilizing, canning, yes and refrigerating equipment.

***Tycos* CONTROL • *Tycos* CONTROL • *Tycos* CONTROL • *Tycos* CONTROL**





For full details, address

Taylor

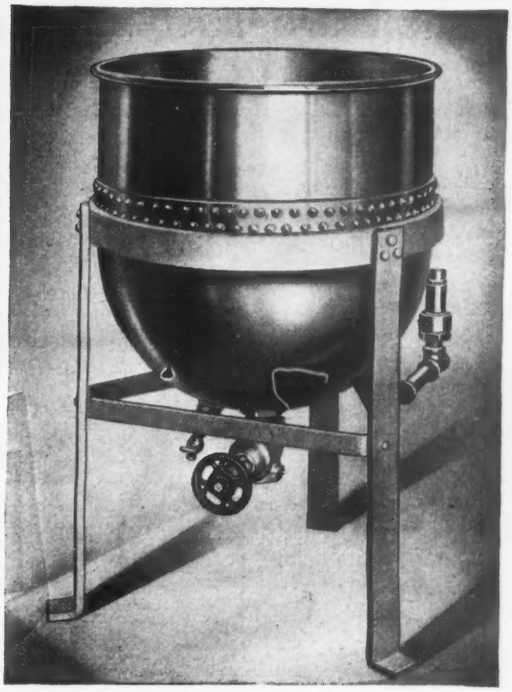
Instrument Companies

ROCHESTER, N. Y., U. S. A.

Canadian Plant, *Tycos* Building, Toronto

Manufacturing Distributors in Great Britain, Short & Mason, Ltd., London

Sholes and Co. Inc., New York City, are regularly fabricating kettles like those illustrated, and other processing equipment, from ENDURO . . . the perfected stainless steel.



LEADING MANUFACTURERS NOW SUPPLY PERMANENT PROCESSING EQUIPMENT OF ENDURO

the perfected stainless steel

■ In kettles, as well as in all other types of processing equipment, you can now secure the advantages...*and economies*...of ENDURO, the perfected stainless steel.

■ ENDURO has solved all equipment problems of the food industry, because it is immune to the corrosive action of food and fruit acids...protects all products against contamination or even change in taste or color...and due to its exceptionally high strength eliminates frequent replacement costs.

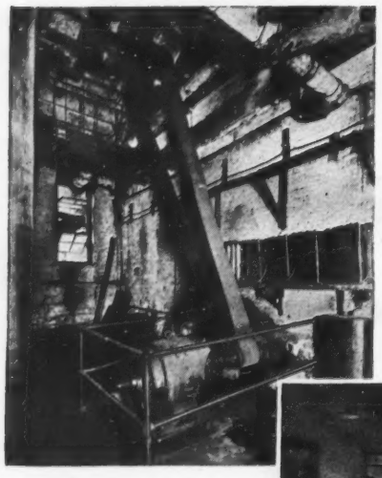
■ When you install new equipment, insist that strong, unplated ENDURO be used in its manufacture. All leading equipment manufacturers can supply it. Write now for complete data.

ENDURO
NIROSTA KA2
the perfected stainless steel

Central Alloy Division

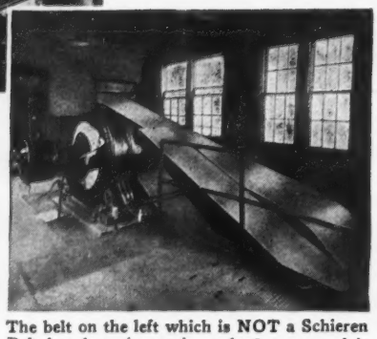
REPUBLIC STEEL CORPORATION
Massillon, Ohio

"The Value of Long Life at no Extra Cost" is the testimony of owner service records...



44 Years of Service

A 12 inch double Schieren Belt transmitting 75 H.P. from an 11 inch motor pulley to a 48 inch pulley. This belt was installed in 1886 and was in constant service until May, 1930.



33 Years of Service

A 42 inch 3 ply Schieren Belt on main engine drive (belt shown at right of photo) transmitting 300 H.P. This belt was run night and day for 12 years and has been in service 33 years. It is still in good operating condition.

The belt on the left which is NOT a Schieren Belt has been in service only 8 years and is already showing signs of disintegration.

DUXBAK LEATHER BELTING

has abolished the old idea that long life is something that costs extra. It doesn't! The extra long life of Duxbak Belting is an added value . . . to you . . . but it costs no more. We secure long life and pliability in Duxbak belting by scouring the leather . . . at very small cost to us . . . and at no extra cost to you. Owner service records testify to the unusually long life THEY find in Duxbak Belting. 47 years, 31 years, 14 years, etc., are actual records of Duxbak in service. It costs no more but it saves so many power transmission dollars. You probably have a few dollars you would like to save. Investigate Duxbak and get your costs down.

DUXBAK BELTING

Chas. A. Schieren Company

Tanners
Belt Manufacturers
40 FERRY STREET NEW YORK

CHAS. A. SCHIEREN COMPANY OF CANADA
711 St. James Street, Montreal, P. Q.
64-66 Front Street, W., Toronto, Ont.

CHAS. A. SCHIEREN COMPANY
40 Ferry Street, New York, N. Y.

Send me a copy of folder describing the new Rockwood Short Center Drive.

Name.....

Position.....

Company.....

Address.....

Be prepared!

CLEANING isn't a problem until your rush season comes along. And it won't be a problem then either, if you use Oakite.

The energetic action of this powerful, but safe material eliminates all cleaning delays that hold up production—protects the quality of your product, because it quickly removes tallow, grease, corn slop, tomato juice . . . and every other deposit . . . and then rinses off completely.

Be prepared by calling in our near-by Service Man now, while you have the time. Let him explain how Oakite will take care of your rush-season cleaning, when you most need its economy, speed and certainty. No obligation.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the United States and Canada

Manufactured only by
OAKITE PRODUCTS, INC., 26G Thames St., NEW YORK, N. Y.

OAKITE

TRADE MARK REG. U.S. PAT. OFF.

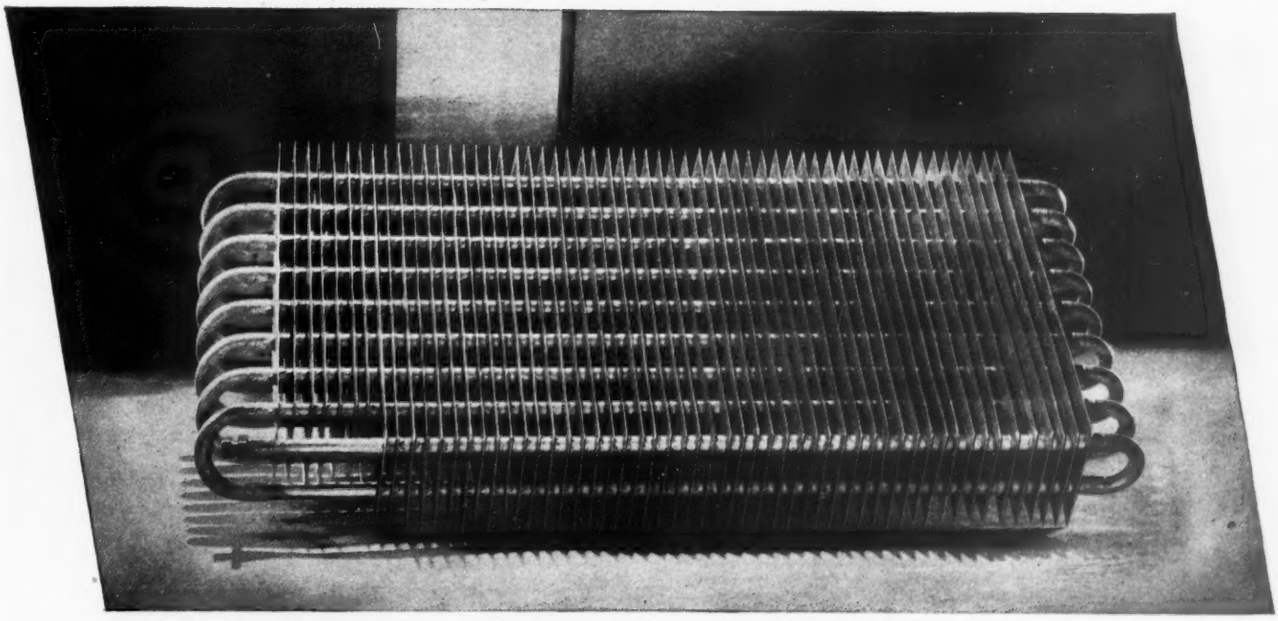
Industrial Cleaning Materials and Methods

FOR THE FIRST TIME MIKRO-PULVERIZER will be shown at the Chemical Show. Plan now to attend the show and make a note to see the Mikro Exhibit. Meantime if you will send for Catalog No. 16 . . . you will learn why the MIKRO-PULVERIZER has been adopted by the largest manufacturers in the food industries, baking companies, sugar refineries, chocolate manufacturers, etc.

PULVERIZING MACHINERY CO.
30 Church St., New York City

An Announcement

. . . OF IMPORTANCE TO FOOD MANUFACTURERS



KELVINATOR Engineers contribute another noteworthy advancement to commercial electric refrigeration—the *Dry System* Cross Fin Coil.

In the introduction of this important piece of refrigeration equipment, Kelvinator brings the many advantages of automatic electric refrigeration within the reach of the smaller food manufacturers. And at the same time, makes it possible for large establishments to secure more efficient, more flexible multiple installations *at appreciably lower costs.*

With the Flooded System Cross Fin Coil, which was introduced by Kelvinator three years ago, and now the new Dry System Coil, Kelvinator offers food manufacturers a complete line of dependable, economical equipment for every refrigeration need.

Complete information regarding the new Dry System Coil will be sent on request.

FEATURES

—automatic defrosting cycle which prevents dehydration and drying out of refrigerator contents

—the greatest cooling capacity in any given space

—made of copper, brass and bronze—and electroplated to insure perfect conductivity and cooling efficiency

—can be installed without the necessity of expensive alterations

—fully automatic, absolutely trouble-proof, and designed for years and years of economical service

—a full range of sizes and types to meet every refrigeration requirement of both large and small food manufacturers.

Kelvinator Corporation, 14271 Plymouth Road, Detroit, Michigan
Kelvinator of Canada, Limited, London, Ontario
Kelvinator Limited, London, England

(202)

Kelvinator

FORT WORTH food purveyor to the Southwest

FROM the verdant valley of the Rio Grande on the south, with its wonderful production of luscious citrus fruits; to the broad plains of the Panhandle with their thousand-acre fields of waving grains—from the vast West Texas ranches with their pure-bred cattle to the wonderful modern dairy farms in the eastern part of the state—and with endless rich acres of fruits and vegetables of every description and many of the leading poultry farms of the country in its immediate vicinity—Fort Worth is the clearing house for one of the richest food production sections of the United States.

Fort Worth is the rail transportation center of this great territory with 19 rail outlets and a dozen airplane lines which cover 20,000 miles daily.

Fort Worth offers the manufacturer every economic advantage—cheap fuel and power; unexcelled transportation facilities; intelligent, native-white labor; a bountiful water supply; ideal climatic conditions and the fastest growing consuming market in the country.

It is the largest livestock market in the South—the largest packing center in the South—the largest terminal grain center in the South—Fort Worth is, indeed, "food purveyor to the Southwest."

Write today for your copy of INDUSTRIAL FORT WORTH

12 AIR LINES

FORT WORTH

THE MANUFACTURING AND TRANSPORTATION CENTRE OF THE SOUTHWEST

19 RAIL OUTLETS

For Information Address Publicity Department CHAMBER OF COMMERCE, FORT WORTH, TEXAS

PFIZER'S CITRIC ACID

POWDERED

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UNIFORM QUALITY

STRICTLY-U.S.P.

• EIGHTY YEARS OF MANUFACTURING EXPERIENCE BEHIND OUR PRODUCTS

CHAS. PFIZER AND CO. INC.

MANUFACTURING CHEMISTS

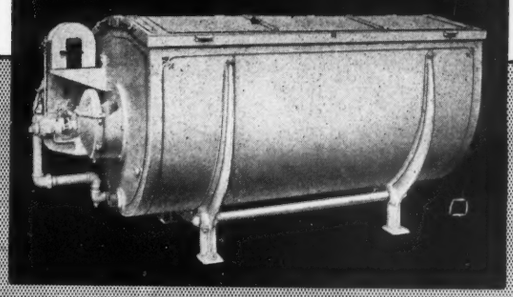
81 Maiden Lane New York N.Y.

Est. 1849

444 W. Grand Ave Chicago Ill.

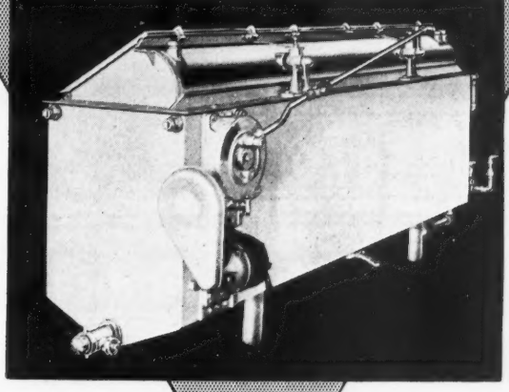
COIL TYPE

Cherry-Burrell Class "K" Coil Machines



SPRAY TYPE

Cherry-Burrell Spray Machines



HEATING COOLING HOLDING MIXING

THE processing of an increasing number of food products—such, for instance, as fruit and vegetable juices, beverages of many kinds, cake mix, bread mix—calls for accurately, positively controlled heating, holding, cooling, mixing in sanitary equipment of highly developed efficiency.

Like the dairy industry, the food industry intrusts these delicate and essential processes to CHERRY-BURRELL machines of either the SPRAY or the SUBMERGED TWIN-COIL type. The food industry, too, has come to depend on this equipment for unvarying fine performance—ease and economy of operation—ease of cleaning — highly developed sanitation — slow depreciation.

CLASS "K" TWIN-COIL MACHINES in capacities from 100 to 1000 gallons. Linings of tinned copper, pure nickel, seamless alloy steel. SPRAY MACHINES in capacities from 125 to 500 gallons. Also tinned copper, pure nickel and alloy steel lined. Write for descriptive, illustrated bulletin on both types.

CHERRY-BURRELL CORPORATION
427 W. RANDOLPH ST., CHICAGO

BALTIMORE BOSTON CEDAR RAPIDS CINCINNATI CLEVELAND COLUMBUS DETROIT LITTLE FALLS MILWAUKEE NEW YORK CITY PEORIA PITTSBURGH PHILADELPHIA ST. PAUL SYRACUSE TAMA

CHERRY-BURRELL CORPORATION OF CANADA, LTD., TORONTO 2, ONT. - - BROCKVILLE, ONT.

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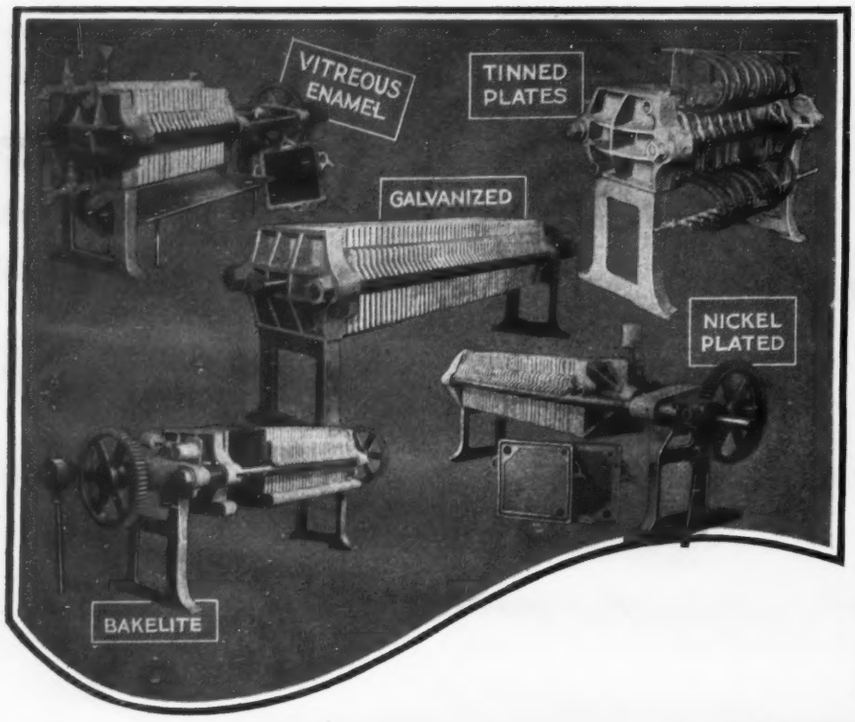
CHERRY-BURRELL, LTD., LONDON, ENGLAND

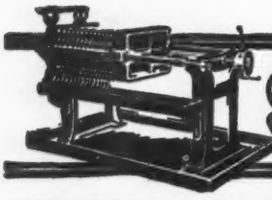


Coated Plate Presses

Coated plate presses are offered in a wide variety and for a multitude of filtering applications in the Sperry Line. Coated plates with a cast iron base are comparatively inexpensive and with moderate care in handling will last indefinitely.

A few typical presses we have designed are illustrated above. Your particular problem may require slightly different plate design or material. We will be glad to work with you in designing the most efficient and inexpensive press for your need.

D. R. SPERRY & CO., BATAVIA, ILL.

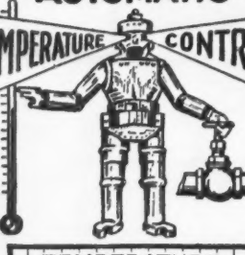


SPERRY FILTER PRESSES

H. E. JACOBY, 95 Liberty Street
New York

B. M. PILHASHY, Merchants Exchange Bldg.
San Francisco

AUTOMATIC TEMPERATURE CONTROL



35 Years of Specialization in Temperature Control

TO ERR IS HUMAN—to eliminate the occasional errors of hand control of temperature with the mechanical accuracy of a Powers Regulator not only speeds up production—but secures a still better and more uniform product. Let our engineers study your problems of temperature control and recommend the type of regulator that will give best results at lowest cost.

THE POWERS REGULATOR CO., 2755 Greenview Ave., CHICAGO
Offices in 37 Cities

The POWERS REGULATOR CO.

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Every issue of Food Industries published to date has been over-subscribed within a few days after its appearance, and we still have on hand orders for thousands of copies which we cannot supply. ● We dislike to disappoint anyone wishing a back number, but you will agree that there is no point in our printing a lot of copies that must be ultimately thrown away. We try, insofar as is possible, to limit our production of a particular issue to the demand for it. ● The best way to insure your receiving every copy of Food Industries is to mail your subscription now. Use the convenient coupon . . . 2 years—$3 . . . 1 year—$2. In lots of 5 or more $1.50 each per year.

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Please enter my subscription for——years at——dollars.

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SCOVILLE CANNING COMPANY
FIG STREET AND GILCHRIST AVENUE
TAMPA, FLORIDA
April 3, 1930
Sarco Company, Inc.,
Att: Mr. H. G. Carter, District Rep.,
Tampa, Fla.
Gentlemen:
We have used one of your ¾ inch type TR 25 Sarco regulators during one entire canning season and we have found this regulator entirely satisfactory, affording as close regulation as one degree Fahrenheit.
We are very glad to recommend Sarco regulators to anyone desiring a reliable instrument for this purpose.
Yours very truly,
SCOVILLE CANNING COMPANY
BY

SARCO

Temperature Regulator Holds Temperature Within 1° F. Here

The above is the record of a Sarco Temperature Regulator in Scoville Canning Co.'s plant at Tampa, as shown by their letter and chart.

The Sarco accurately maintains any given temperature, and does it automatically. Why depend upon guesswork, when you can have absolute certainty?

Some of the reasons for the accuracy and dependability of the Sarco are:

Thermostat holds valve wide open until the setting point is closely approached, resulting in quick heating without manipulation of a by-pass.

Stem leakage and sticking are eliminated because of the packless sealed valve stem, which takes the place of a stuffing box.

It has great sensitivity at all points of the range, due to the greater power of its hydraulic thermostatic system.

Other features explained in Booklet No. AE-70. Write for a copy and our 30-day free trial proposition.

SARCO CO., Inc.

183 Madison Ave., New York, N. Y.

Sarco (Canada) Limited, Federal Bldg.,
83 Richmond St., West, Toronto, Ontario, Canada
Branches in Principal Cities

SARCO CO., Inc.,
183 Madison Ave., New York.

Without obligation on our part please send Temperature Regulator Booklet AE-70.

Name.....

Address.....

Town.....State.....

A PRODUCT IS KNOWN BY THE QUALITY IT KEEPS

KEEP in the quality you **pack** in. Retain all the original aroma and taste; protect it all the way to the buyer's table. This is the final test of Quality and Profit.

AND BOTH DEPEND ON THE WRAPPER!

Today markets reach farther than ever. Yet both distance and time are overcome by the use of KVP Protective Papers.

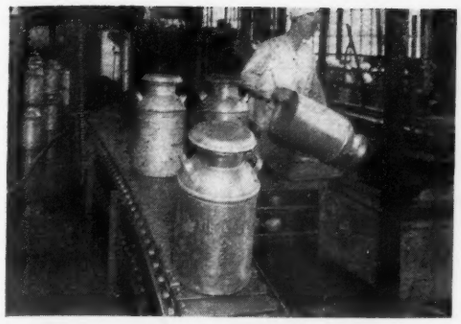
They render the most varied and exacting types of service to the satisfaction of leaders in all lines of food industry.

Whatever your need, you may entrust your **quality** to KVP Papers. They guard against loss of flavor and outside taint. They are odorless, tasteless and resistant to water, grease and oil.

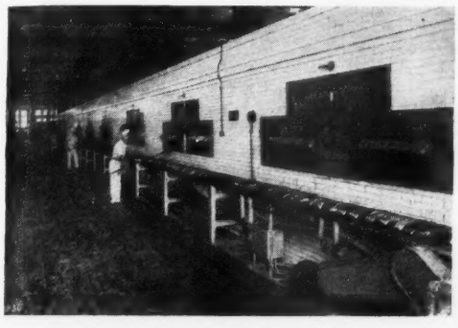
Let KVP research engineers advise as to the best type of wrapper for your special needs. Write for information and samples.

Kalamazoo Vegetable Parchment Co.
KALAMAZOO - MICHIGAN

KVP PROTECTION PAPERS



RECEIVING (Milk)

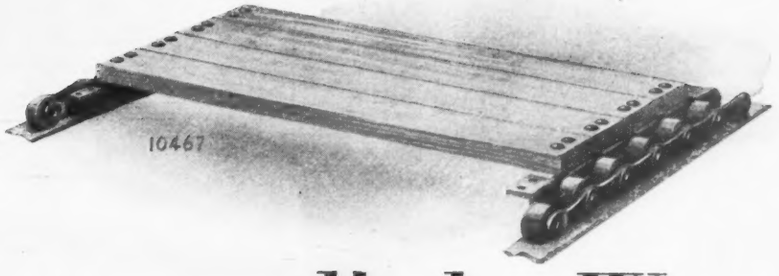


PRODUCTION (Bread)

PACKING & STORING
(Canned and Bottled Products)

SHIPPING (Candy)

USEFUL--



- - - all the Way

Sturdy—Easily installed—as light or heavy as the work requires—Jeffrey Apron Conveyors are useful carriers from the time raw materials are received until they are delivered to cars or trucks for shipment.

They will handle without damage delicate raw material like grapes or tomatoes—assist in production, for example, carrying bread from ovens, tomatoes to and from washer, etc.—carry packages or finished products to warehouse and shipping platform—dispose of waste.

Jeffrey Apron Conveyors operate on moderate inclines as well as horizontal; with retarding flights, they will carry material up steep inclines. Specially shaped flights may be had for carrying barrels or odd shaped products which would tend to roll or slide on the flat flights. Overlapping double beaded flights on the Steel Apron provide a practically leak-proof continuous trough.

Almost any plant has a use for a Jeffrey Wood or Steel Apron Conveyor—or one of the other Jeffrey line—which includes also Belt, Scraper, Pivoted Bucket, V Bucket and Spiral Conveyors—Bucket Elevators, etc. Jeffrey also builds Peeling Tables, Washers, and other machinery used in preparatory work.

Bulletins describing any of these units will be gladly sent on request.

The Jeffrey Manufacturing Company
927-99 North Fourth St., Columbus, Ohio

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Buffalo	Boston	Chicago	Birmingham
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Jeffrey Manufacturing Company, Ltd., of Canada
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Conveyors—Elevators
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Portable Loaders
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JEFFREY
MATERIAL HANDLING EQUIPMENT

158 ITEMS » »

and every one represents Manufacturing Equipment

From celery to Camembert, every one of the scores of foods on any first-class menu represents the product of a going industry—an industry with problems of production, selling, distribution; with substantial investments in real estate, equipment and buildings, too, in most cases.

Together, these many branches of the Food Industry constitute a tremendous market. Nearly 55,000 plants are engaged in manufacturing or processing foods; their products alone are valued at more than $11,700,000,000 annually. Their purchases of materials, supplies and equipment are correspondingly huge.

Of this group, a few more than 10,000 plants are responsible for 89.4% of the total production value, according to the U. S. Census of Manufactures. And it is for these 10,000 leaders in all branches of Food Manufacture, with their many common interests and similar problems, that FOOD INDUSTRIES is edited.

Until FOOD INDUSTRIES came into existence a little more than two years ago, there was no single publication that provided coverage of this great market. Today, FOOD INDUSTRIES has over 7500 paid subscriptions covering the chief buying power in every important branch of the industry.

If you sell a product that Food Manufacturers can profitably use, FOOD INDUSTRIES is **your** advertising medium. Ask us for the details.

This "Fact-Picture of the Food Field" contains much helpful information. Ask for your copy.

THERE IS NO BUSINESS MORE FUNDAMENTAL THAN THE

FOOD INDUSTRIES

McGRAW-HILL PUBLISHING COMPANY, INC., TENTH AVENUE AT 36th STREET, NEW YORK

IMPORTANT STEPS IN THE PROCESSING OF FOOD PRODUCTS

CRUSHING — GRINDING — PULVERIZING — PROPORTIONING — SIFTING — MIXING

AND for each step there is a UNIQUE Machine of proven merit—proven by actual successful operation on hundreds of food products and under all kinds of operating conditions.

Constant uniformity in production and efficient, economical operation are paramount qualities to the success of every Food Processing Plant and they are assured through the operation of UNIQUE Process Equipment.

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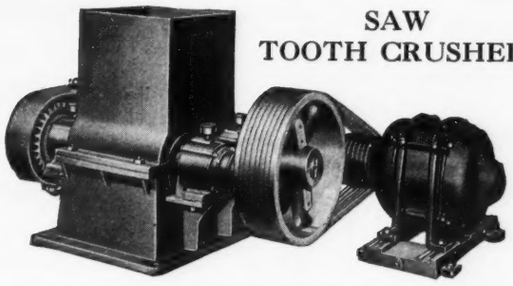
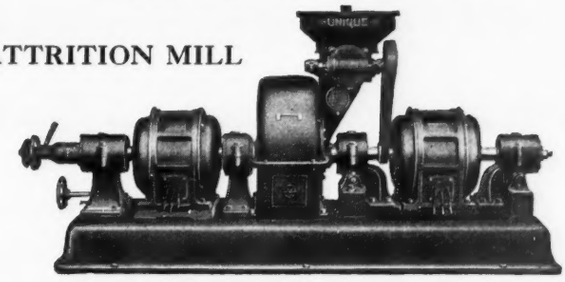


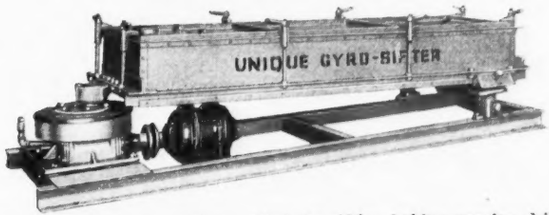
Reduces all types of lumpy products to a finish or preparatory to feeding into fine grinding machines.

ATTRITION MILL



Grinds and pulverizes sugar, spices, all kinds of cereals, etc. More than 2000 in successful operation.

THE GYRO-SIFTER



For all "siftable" materials. Ideal for sifting baking powder, dried eggs, milk powder, spices, salt, soda, etc. Built for making 1 to 5 separations. Many sizes.

MIXERS FOR EVERY PURPOSE

We build machines for mixing all types of dry powders, semi-solids, and liquids. Our line is the most extensive ever offered to the industries.

Let us show you how ROBINSON Engineers, with a background of more than thirty years of experience in the Food Industries, can adapt UNIQUE Machinery and Material Handling Equipment to successful production in YOUR Plant. They have given this service to many of the Country's finest and largest Food Processing Plants and will welcome the opportunity to assist in solving your problems.

Write for Literature TODAY.

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ROBINSON MFG. CO.

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and **HUMPY HEAT**

Means Fuel Waste

First "too hot" and then "too cold!" That is the daily temperature record of rooms and offices in many buildings where hand control valves are employed on steam radiators. Sylphon Automatic Radiator Valves insure temperatures automatically kept just as desired by the room occupants. Their use makes for steady, even heat—personal comfort, health and more efficiency.

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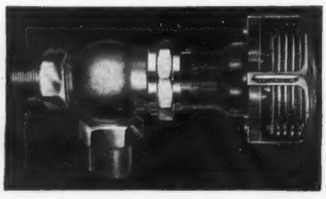
Sylphon Automatic Radiator Valve

Easy to Install

The Sylphon Radiator Valve is a combination packless valve and thermostatic control unit without electrical or mechanical accessories. . . . Know all about this controlling device of lasting efficiency. Our printed matter fully describing both the angle and globe types will be gladly sent. Write today for Bulletin CG 250.



30 Day Free Trial In order that you may be convinced of its positive action, we will gladly send one or more of these Sylphon No. 875 Radiator Valves on a 30 day free trial, and you incur no obligations. Try one now.

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AS THOROUGHLY AS YOU STERILIZE
WITH LARVACIDE (Chlorpicrin) REGISTERED

No half way measures will do in food sterilization and by the same token your plant fumigation *must* be positive, thorough and complete. If you would be sure, use LARVACIDE—the ideal fumigant. It gives a 100% kill with safety because of its self announcing characteristic.

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A FACT-PICTURE OF THE FOOD FIELDS

including the latest available data concerning Production, Consumption, Exports and Imports and other helpful market information.

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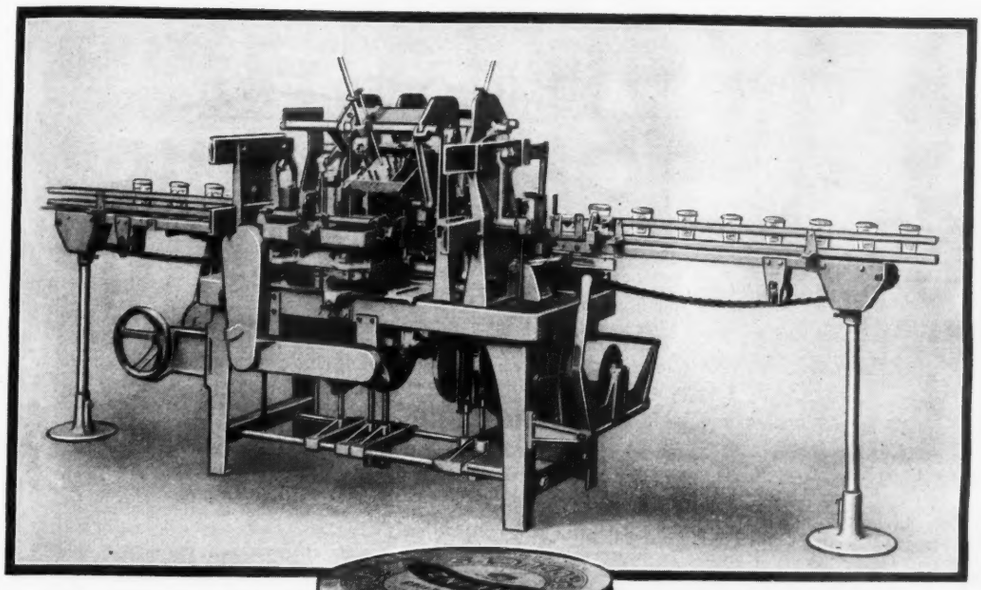
FOOD INDUSTRIES has for limited distribution a 12 page booklet in handy filing size, reprinting the special statistical section from the January "Research" Number. While the supply lasts, we will be glad to take care of requests for extra copies. Address the Marketing Bureau, FOOD INDUSTRIES, Tenth Avenue at 36th St., New York City.

SEND FOR YOUR COPY



Another World labeling success»
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made by
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WORLD Automatic Straightaway Labeler is made in two types» for face labeling and double labeling at one operation.

This fully automatic machine is proving its worth, labeling flat, round, oval or panel bottles and jars and other packages in various sizes.

Let us show you how this outstanding machine can increase your profits.

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Largest Manufacturers of Labeling Machines in the World

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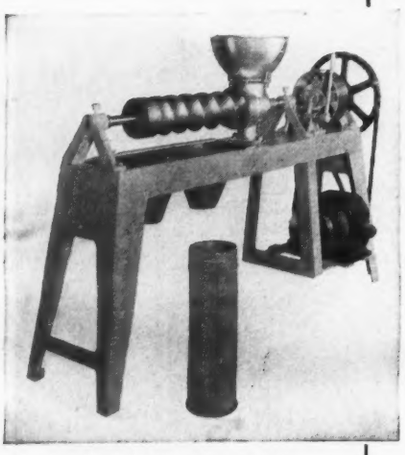

● Over seventy of our Tomato Juice Extractors were used last season by the most representative packers. Their experiences in making Tomato Juice have been incorporated in our improved machine. *We have increased the capacity* and made the machine easier to operate. All new parts fit into the machines used last season and are interchangeable with the old parts.

Capacity 2000 bushels per day

The American Utensil Company offers its

IMPROVED—1931—

TOMATO JUICE EXTRACTOR

This is an inexpensive, continuous feed device which works by reason of the unique shape of the spiral and not by any speed arrangement. It is not a pulper with juice as a second thought. It is designed to make juice only, of any consistency desired, either thick or thin, and can be so adjusted while in operation.

PRESSURE . . . NOT SPEED

The juice is removed by the pressure derived from a cylindrical shaped, tapered feed screw, which revolves inside of a very fine mesh pure nickel screen. The juice is gradually pressed or squeezed through the screen as the tomatoes work forward and up from the deep grooves at the inner end of the spiral to the more shallow grooves at the outer end. By means of an adjustable separator under the screen, the heavier pulp is blocked off from the juice and taken off through a separate outlet, and the seeds, fibre, skins and cores are discharged at the outer end of the screen.

COMPLETELY NON-AERATING

Tomato Juice, if made the proper way, is wanted because of its pleasing taste and high food value. Both can be very easily destroyed by aeration in the making of the juice. That is why we offer a wholly non-aerating machine. No beating or whipping process that incorporates air and destroys the vitamins is necessary or present at any time with our equipment. This assertion is best proved by our large list of users who will tolerate only the best.

American Utensil Co., 10 So. La Salle St., Chicago

—how to WIN loyalty, cooperation, from your associates in business

THIS new and enlarged edition of a widely-read book gives in still more helpful form a definite analysis of successful executive conduct, and direct methods for most effectively securing cooperation among one's business associates.

Tells How to Get Work Done

PRACTICALLY every factor which is at all likely to affect "getting the work done" is given a clear discussion—and, in each instance, the most valuable kind of suggestions are made for the turning of that factor to the very best advantage.

In relation with subordinates, here you find "executive tools" for stimulating and guiding employees; in relation with associates and superiors, practical counsel for the handling of: disagreement with orders—delays in required action—opposition to your methods—and countless other problems.

By
Erwin H. Schell
Member of the Faculty, Massachusetts Institute of Technology

Third Edition

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THE title (above) of the brand new TAG Canning Catalog speaks for itself. Everything is in it that you should know about the safeguarding of your pack by temperature and pressure indicating, controlling and recording instruments.
Your cookers, TAG equipped, as described in this catalog are served with the touch of a wizard. Send for your copy of Catalog No. 440-2.
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Instruments for Indicating, Recording and Controlling
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IF IT LOOKS LIKE IT CAN'T BE DONE

. . . *call for a Packomatic Engineer*

Each year, the wide awake manufacturer witnesses great changes—New methods of merchandising—New transportation facilities—New manufacturing conditions—A new demand for packaged products.

Keep in step with the trend of the times. Equip your plant to meet these conditions as they develop.

Packomatic machinery is in tune with these new demands with a complete line of machinery to meet your requirements.

No matter what your packaging problem, we are anxious to help you. We're used to tough jobs. Call on us. There are more than 2,000 manufacturers now using Packomatic Packaging Machinery.

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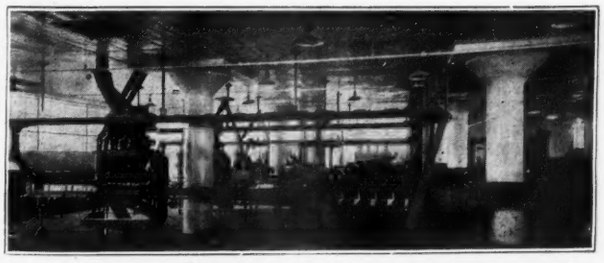

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Take an old product and make it new by Unit Spray-Drying. You can do this easily and at moderate first cost. Your initial capital risk will not be great and your equipment can grow with the market for your product . . . *Now a New Product with a New Market.*

High speed, motor driven disc atomizers are used in our Unit Spray Driers. These atomizers are simple, have a long life, and will atomize anything that can be pumped through an 1½" pipe. Sludges, slurries, solutions, suspensions . . . are all alike to these atomizers. Fibres make no difference either. A valuable *New Product* awaits you.

We will gladly furnish additional information about UNIT SPRAY DRIERS if you will write us.

UNIT SPRAY DRIERS

TYPE A $7500

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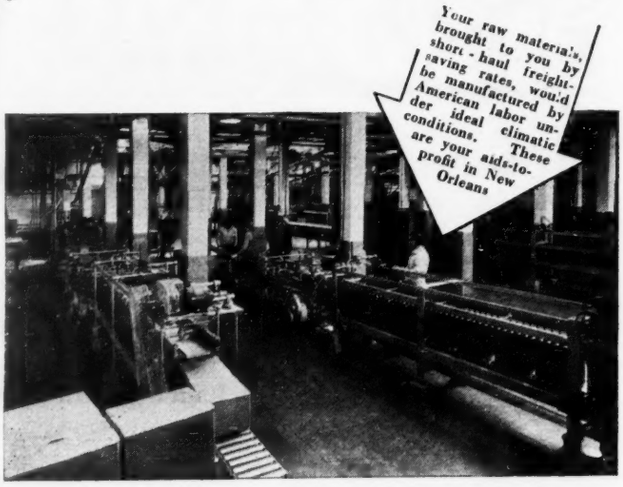
BOWEN RESEARCH CORPORATION,
117 LIBERTY STREET, NEW YORK

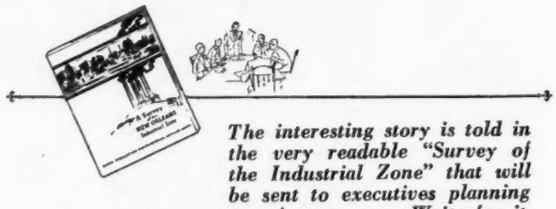
If this were *your* Food Industry


Your raw materials, brought to you by short-haul freight-saving rates, would be manufactured by American labor under ideal climatic conditions. These are your aids-to-profit in New Orleans

You know why the South has become a growing industrial territory. There was a natural trend to manufacture nearer the source of supply. Now the trend is more definitely toward New Orleans. The emphasis is on economical production PLUS new, profitable markets.

Food industries in New Orleans use the barge lines, nine trunk railways and ninety steamship lines;—unparalleled facilities. They enjoy a competitive advantage in shipping to the Mississippi Valley . . . to the east and west coasts . . . to the fast developing markets in South America. These advantages can be turned into sales. Entire buying-populations can be dominated from New Orleans.

NEW ORLEANS
ASSOCIATION OF COMMERCE



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LOW COST

BE PREPARED for wet, icy highways . . . eliminate unnecessary road delays . . . specify Firestone Gum-Dipped Tires, Puncture-Proof Tubes and Firestone Rims when purchasing new equipment. ▼ ▼ ▼ ▼ ▼

Firestone

TRUCK *and* BUS BALLOONS

TIRES ▼ TUBES ▼ RIMS ▼ BATTERIES ▼ BRAKE LINING

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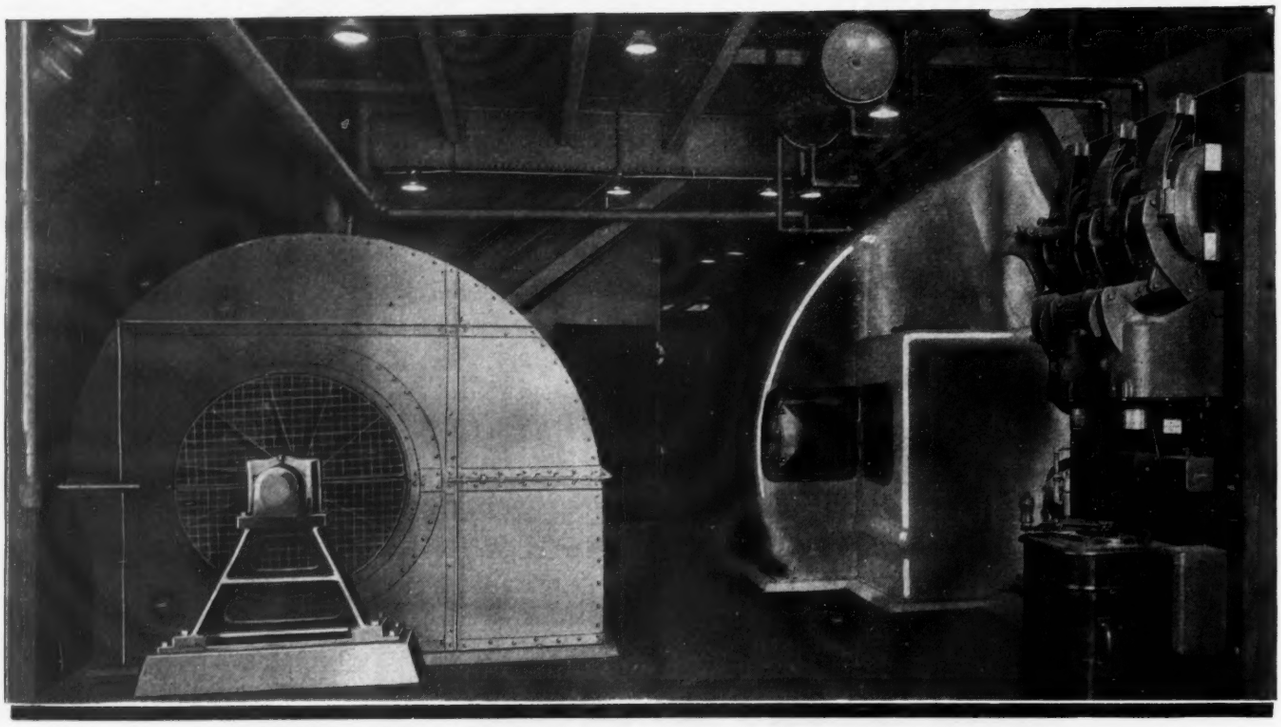

Air-minded? *Of Course*

When our men visit a plant in the food industry, they are often able to point out opportunities to cut costs, speed up production, or reduce the possibilities of spoilage—usually through the application of the proper fan equipment.

This "air mindedness" of men who specialize on ventilation, cooling, drying and heating enables them to serve you particularly well—Why not take advantage of this ability by getting their recommendations on your heating and ventilating problems?

Buffalo Forge Company
181 Mortimer St., Buffalo, N. Y.
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"Buffalo" Heating—Ventilating Mechanical Draft Apparatus

Manufacture in Your Market *and* CUT Distribution Costs

More than one-fifth of the country's consumer purchasing power is concentrated in the territory covered by regularly scheduled overnight trucking service from Philadelphia.

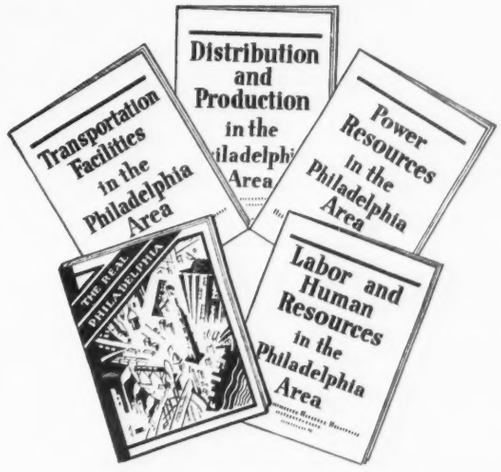
This means that today's factory output can be on the counter tomorrow—ready for the needs of more than 17,500,000 persons with a spendable income of $21,800,000,000 annually.

Transportation advantages of Philadelphia are further illustrated by the fact that you can ship from here to the Pacific Coast by water at less than inland manufacturers spend to reach the same points by rail unless they are located west of Denver.

The port facilities that make this possible give you every advantage in bringing in your raw materials. Shipping is easy because trunk line railroads run their freight cars down the docks to the side of the ship, eliminating lighterage and incidental delay.

Everything needed for packaging —cans, bottles, cartons, boxes— manufactured in quantity right at hand. Power and fuel are low. Labor is highly productive. Plant sites are available at reasonable prices.

Specific data on Philadelphia's advantages for your branch of the food industry will be furnished without cost or obligation. Use your business stationery and address Department O.


Transportation Facilities in the Philadelphia Area
Distribution and Production in the iladelphi Area
Power Resources in the Philadelphia Area
THE REAL PHILADELPHIA
Labor and Human Resources in the Philadelphia Area

Any of these free booklets may contain the key to your door of opportunity.

PHILADELPHIA

Business Progress Association

1442 Widener Building, Philadelphia

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POSITIONS WANTED

FOOD DEMONSTRATOR available for metropolitan New York area. Excellent record in store and food show demonstrations. Ability can be verified by reference to actual results. Mrs. C. B. Spiro, Apartment 3-F, 41 West 86th Street, New York City. Phone Schuyler 4-6640.

FROZEN FOOD SPECIALIST, former assistant plant manager of large quick-freezing establishment seeks position as manager or superintendent of plant producing frozen foods. Graduate mechanical engineer. Thorough knowledge of refrigeration. Qualified to assume full responsibilities. Age 39. Full details will be sent to any interested concerns. PW-71, Food Industries, Tenth Ave. at 36th St., New York.

WANTED: Executive or traveling position by lady, experienced instructor and lecturer on home economics, cookery and sales promotion work. More than eight years in utility field. Traveled extensively, enjoy meeting people. Interested in permanent connection. Reference. Miss Pauline L. Rohrs. PW-70, Food Industries, Tenth Ave. at 36th St., New York.

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MR. FOOD MANUFACTURER: If you need reliable salesman to sell your products throughout the country or in any special territory you should place your need before the live wire readers of Food Industries in the very next issue. Send your ad. today to Searchlight Dept., Food Industries, Tenth Avenue at 36th Street, New York.

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offers real inducements for new industries. Communicate with Romeo Morrissette, city engineer.

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1—75-ton Corliss Engine Driven—Vilter Ice Machine
Engine 16 in.x36 in.—Pressure 150 lb.
Compressor 14 in. x 28 in.
Condition—Good.

1—50-ton Corliss Driven Engine—Vilter Ice Machine
Engine 14 in. x 30 in—Pressure 150 lb.
Compressor 12 in. x 24 in.
Condition—Good.

Generators

1—Allis-Chalmers D.C. Genreator
75 kw.—125 volts—250 r.p.m.
Direct connected to skinner engine
Working Pressure 150 lbs.
Condition—Good.

1—General Electric D. C. Generator
60 kw.—125 volts—280 r.p.m.
Direct connected to Side Crank Fleming Engine
Pressure 150 lb.
Condition—Good.

Boiler

1—B. & W. Boiler—Cross drum type
108—16 ft. x 4 in. tubes
Cast Iron Headers—250 hp. rating.

This equipment can be seen in operation. Delivery during month of April, 1931. Being sold due to the fact that we are compelled to move to new site.

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Philadelphia, Pa.

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Copper Steam Jacketed Kettles, Dough and Food Product Mixers, Bottle Washing Machines, Copper and Glass Lined Tanks, Filters, Filter Presses, Mills, etc.

We also purchase food product equipment. What have you to offer?

Loeb Equipment Co.
618-620 W. Lake St., Chicago, Ill.

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Buffalo Nut and Food Chopper, motor drive.
Day Clipper Egg Beaters, belt drive.
Double Pan Rack Trucks on casters.
Dough Mixers, single and double arm.
Leonard Date Pitter, motor drive.
Motors, D.C., 230 volt, 15 to 35 hp.
Steam Jacketed Copper Kettles, 10 gal. to 350 gal. capacity, with and without agitators, guaranteed steam pressure.

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Since 1855—Candy Machinery—Coppersmiths
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also Wood TANKS and CASKS, all kinds. BOTTLERS' MACHINERY, WASHERS and RINSERS, FILLING and CAPPING Machines, PASTEURIZERS and LABELERS, FILTERS and FILTER PRESSES, every size and style, ROTARY STEAM DRYERS.

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Equipment you have replaced, or for which you have no further use can probably be sold at a good price now. Later it may not be worth as much.

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help you sell it promptly

G-9

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Food Industries
Tenth Ave. at 36th St., New York

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Labels and Advertising Matter Subject to State and Federal Laws.

OFFICE AND LABORATORIES
Columbia Medical Building
1835 Eye Street, N. W., Washington, D. C.

FOOD PLANTS—are generally dependent on the services of the professional consultant for the design of new plants, the perfecting or introducing of new processes, for research work, or for any chemical and scientific work that involves anything outside of ordinary plant routine.
CONSULT the men listed on this page and the opposite page of the "PROFESSIONAL SERVICE SECTION" of FOOD INDUSTRIES when such problems arise.

HINRICHS LABORATORIES
Carl G. Hinrichs, Ph.C., M.S.
Commercial Analyses of Food and Drug Products
Processes, Research, Expert Testimony
4110 Shenandoah Ave., St. Louis, Mo.

CERELOSE
(*Dextrose*)

A Statement to the Trade by the Manufacturers

A recent ruling by the Secretary of Agriculture of the United States discontinued the regulation formerly in effect requiring that the presence of refined corn sugar in certain manufactured food products must be declared on the label.

The ruling is in no sense revolutionary. It merely extends to the manufacturers of all sweetened food products and beverages the same opportunity to use pure *refined* corn sugar that has been enjoyed by the manufacturers of confectionery, ice cream and bakery products.

Cerelose, our trade-marked brand of pure refined crystal corn sugar, has been on the market for about nine years. In that time it has demonstrated its value in a wide field of industrial activity. In other fields of potential usefulness corn sugar has been restricted by the labeling requirement previously mentioned.

It is not our belief that Dextrose can in all cases displace Sucrose. It is not the policy of the company to urge the employment of Cerelose (Dextrose) except in processes where it can be shown to offer a definite economic or scientific advantage. We do not regard Dextrose as in any sense antagonistic to Sucrose, nor do we advocate the replacement of other sugars in a manufacturing formula without previously establishing the practicability of the change on a methodical scientific basis. Cerelose (Dextrose) is a distinct product with its own special properties and virtues. Many of its useful adaptations to industry have been demonstrated; others remain to be determined.

To assist canners, preservers and other food manufacturers in solving specialized problems incidental to the use of refined Cerelose this company is enlarging its laboratory and experiment station facilities to include a proving plant for the practical experimental manufacture of jams, jellies, preserves, catsups, sweet pickles and condiments, the canning of fruits and vegetables and the bottling of still and carbonated beverages.

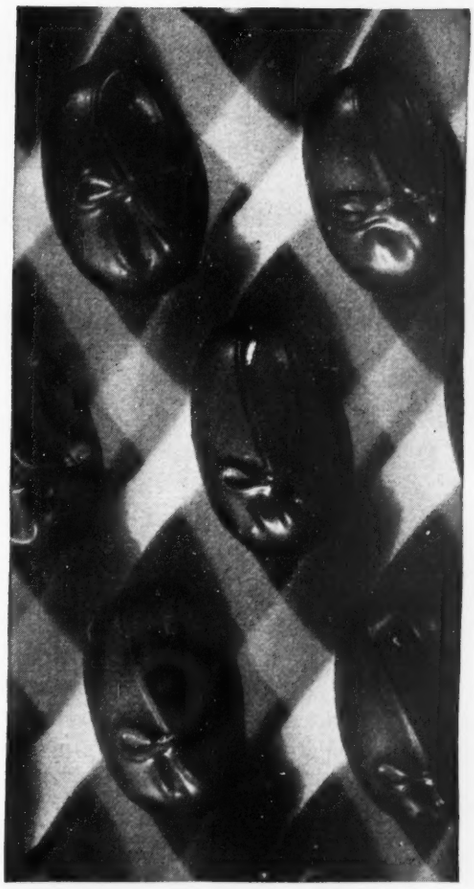
We invite the correspondence of manufacturers interested in the improvement of their products.

CORN PRODUCTS REFINING COMPANY
17 Battery Place New York, U. S. A.

CANDY-MAKERS

(to mention only one example)

have found out how to lick BAD WEATHER!



MANUFACTURED WEATHER ENDS BAD WEATHER!

Their experience points to the tremendous possibilities Manufactured Weather offers all food industries by absolute control of indoor weather

NOT so long ago, candy-makers had to close down their plants for weeks at a time, during the summer. Practically every ingredient of their chocolates and hard candies, their gum drops and marshmallows, is delicately sensitive to atmospheric temperature and humidity. Chocolate won't set . . . fails to develop its eye-appealing sheen . . . if exposed to high temperatures. Starch—used in molding fruit and nut centers—turns out unseasoned, non-uniform fillers unless a uniform low moisture content is maintained. Hard candies get sticky . . . unworkable . . . when temperature and humidity soar.

Today, candies are made all year round, regardless of what outdoor weather conditions may be. With Manufactured Weather—the Carrier system of air conditioning—candy is manufactured under conditions of temperature, humidity, air cleanliness and air motion exactly suited to the product and the process. Already Carrier has been called in by such nationally and internationally known candy-makers as Schrafft's of Boston, with the largest candy factory in the United States; Stephen F. Whitman & Sons, famous for their Samplers; the Nunnally Company of Atlanta; the New England Confectionery Company of Boston; the Beechnut Packing Company of Canajoharie; Moirs, Ltd., of Halifax; Robert A. Johnston Company of Milwaukee.

What Manufactured Weather has done for candy-makers is indicative of what it may be able to do for you in complete control of your weather-sensitive processes. Right now, while you are thinking of it, drop a line to our Newark office telling us how you would like to have weather behave in your business.

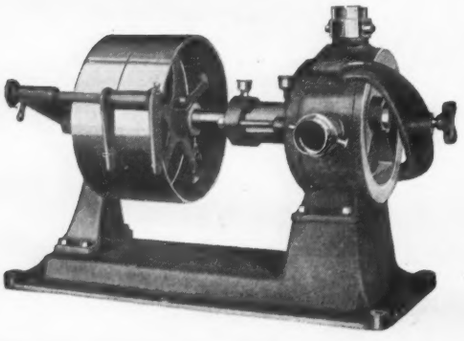
Carrier Engineering Corporation

A DIVISION OF CARRIER CORPORATION

Home Offices: Newark, New Jersey. *Branch Offices:* Boston, New York, Philadelphia, Washington, Cleveland, Detroit, Chicago, Dallas and Los Angeles. For *foreign office* addresses write Newark office.

Well over 3,000 systems of Manufactured Weather are now installed in more than 200 kinds of business

VIKING
Sanitary



Rotary Pumps

There Can Be No Compromise On Cleanliness

In a food plant . . there can be no compromise on cleanliness. All equipment must be kept clean and sterile at all times.

The Viking Sanitary Rotary Pump by the very nature of its simple design is easy to keep clean. Its two moving parts may be taken down—sterilized—and reassembled in a few minutes' time . . with a pair of hands as the only tool. All surfaces are smoothly machined . . impossible for bacteria to lodge or breed.

For absolute sanitation . . for lower liquid food handling costs . . for increased plant efficiency . . install Vikings. May we send you the Viking Catalog?

Viking Pump Company
Cedar Falls, Iowa

VIKING PUMPS

ALPHABETICAL INDEX
• TO ADVERTISERS •

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Food Industries* assumes no responsibility for errors or omissions.

	Page
Allegheny Steel Co.	40
Allis-Chalmers Co.	33
American Air Filter Co., Inc.	28
American Can Company	20
American Gas Ass'n.	2d Cover
American Pulley Co.	6
American Utensil Co.	58
Armstrong Cork & Insulation Co.	3d Cover
Associated Cooperage Industries of American	41
Austin Company	23
Bausch & Lomb Optical Co.	15
Bayley Co., Wm.	24
Bowen Research Corp.	60
Buffalo Forge Co.	62
Butler Mfg. Co.	24
Carrier Engineering Corp.	67
Century Electric Co.	32
Cherry-Burrell Corp.	49
Cleveland Worm & Gear Co.	25
Clipper Belt Lacer Co.	37
Corn Products Refining Co.	66
Diamond Crystal Salt Co.	19
Dodge Brothers	14
Drehmann Paving & Construction Co.	29
Economic Machinery Co.	57
Fairbanks, Morse & Co.	38
Ferguson Co., J. L.	59
Firestone Tire & Rubber Co.	61
Food Industries	54
Fort Worth Chamber of Commerce	48
Fulton Sylphon Co.	56
Galland-Henning Mfg. Co.	8-9
General Motors Truck Co.	21
Innis, Speiden & Co.	56
International Exposition Co.	35
International Nickel Co.	26
Jeffrey Mfg. Co.	53
Jenkins Bros.	39
Kalamazoo Vegetable Parchment Co.	52
Kelvinator Corporation	47
Lamson Company	22
McGill Brothers Rice Mill	34
McGraw-Hill Book Co.	58
Mears-Kane Ofeldt, Inc.	34
Meyercord Co.	Insert 11-12
Morse Chain Co.	38
Moto Meter Gauge & Equipment Corp.	43
New Orleans Ass'n of Commerce.	60
Oakite Products, Inc.	46
Package Machinery Company	18
Perfection Mfg. Co.	31
Pfizer, Chas. Co.	48
Philadelphia Business Progress Ass'n	63
Pneumatic Scale Corp., Ltd.	4
Powers Regulator Co.	50
Pressed Steel Tank Co.	42
Profesional Service	65
Pulverizing Machinery Co.	46
Rec Motor Car Co.	5
Republic Steel Corp.	45
Robinson Mfg. Co.	55
Sarco Company, Inc.	51
Schieren Co., Chas. A.	46
Searchlight Section	64
Service Caster & Truck Co.	31
Sharples Specialty Co.	27
Shriver & Co., T.	34
Sperry Co., D. R.	50
Standard Conveyor Co.	30
Sturtevant Co., B. F.	36
Sutherland Paper Co.	10
Tagliabue Mfg. Co., C. J.	58
Taylor Instrument Companies	44
U. S. Gutta Percha Paint Co.	16-17
Viking Pump Company	68
Vilter Mfg. Co.	43
Wallace & Tiernan Co., Inc.	7
Worthington Pump & Machinery Corp.	Back Cover
York Ice Machinery Corp.	13

SEARCHLIGHT SECTION
Classified Advertising

BUSINESS OPPORTUNITIES	64
EMPLOYMENT	64
USED AND SURPLUS EQUIPMENT	
Loeb Equipment Co.	64
Savage Bros. Co.	64
Universal Co.	64
Vogt & Sons Inc., F. G.	64
PROFESSIONAL SERVICES	65

Write to the Equipment Information Bureau of FOOD INDUSTRIES *for "where-to-buy" data on any products on which you would like further details.*

Cold storage room of the Kraft-Phenix Cheese Company, in Larned, Kansas; insulation of Armstrong's Corkboard, installed by Armstrong engineers.

ARMSTRONG
fits the insulation to your plant..

COLD storage temperatures put a heavy responsibility on insulation. It's important to use the right material for the job, and to have it carefully and competently installed.

When you buy Armstrong's Corkboard you get standard insulation, erected by experts. Armstrong engineers check your requirements carefully. Their recommendations are based on years of experience with every type of refrigeration. Armstrong construction experts, using approved installation methods, assure satisfactory insulation through years of service.

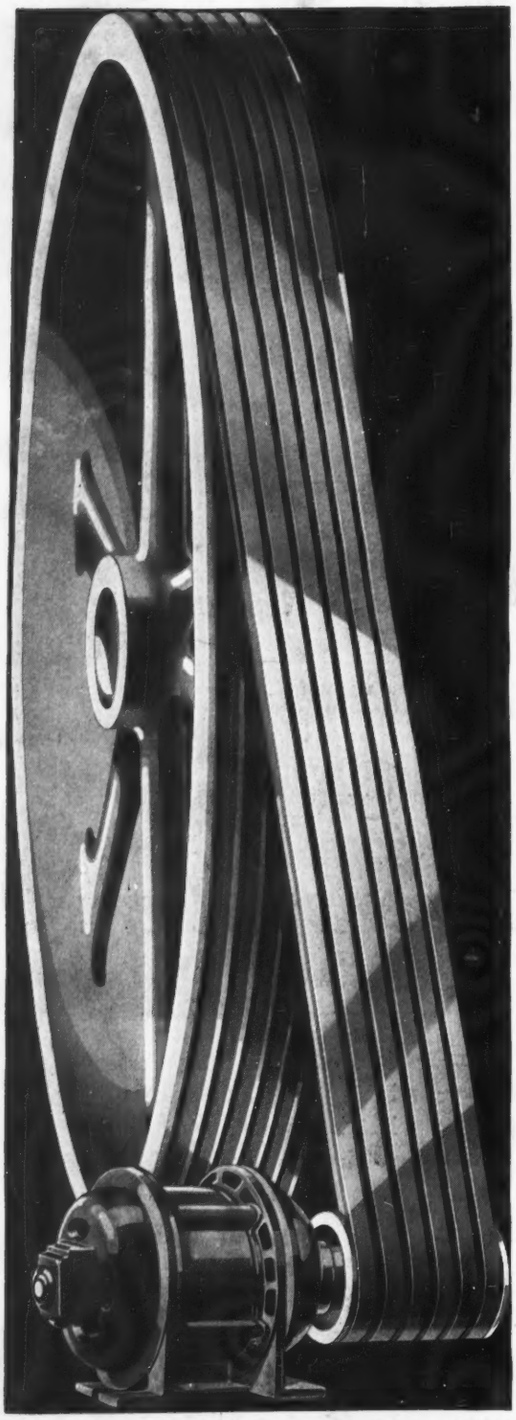
For more than thirty years Armstrong's Corkboard has been standard insulation in the cold storage industry. The experience gained in this time has taught Armstrong just the right methods of erection to follow for best results. Insulation erected by Armstrong does not crack, warp, or buckle, no matter how severe the service.

Armstrong's Corkboard offers low heat conductivity, the first requirement of any insulation. It resists moisture, which penetrates to destroy the efficiency of materials that do not have cork's cellular construction. And cork has the necessary structural strength to stand up in large installations.

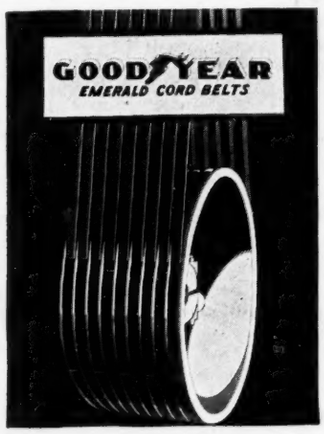
These are some of the reasons why many Armstrong cold storage applications have served for 10, 15, 20 years and more without replacement or major repairs. We would be glad to tell you more about Armstrong's Corkboard and Armstrong service. Write now so that you will have the facts handy when you plan your next insulation job. Address Armstrong Cork & Insulation Co., 948 Concord St., Lancaster, Pa., and Canadian Offices in Montreal Toronto and Winnipeg.

Armstrong's (A) Product

Armstrong's Corkboard Insulation
the Standard Insulation for all Refrigeration



Its Grip permits



short center drives . . . *without idlers*

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This drive consists of endless belts of rubberized cord construction, and V-shaped cross-section, with sheaves having V-shaped grooves.

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Multi-V-Drives are engineered to the job by trained Worthington men . . . and are marketed through mill and machinery supply houses. The nearest Worthington branch office will gladly supply detailed information, *Ask for Bulletin L-400-B1.*

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